

SmartPlant Instrumentation

Basic Engineering User's Guide



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SECTION 1

Working with SmartPlant Instrumentation

SmartPlant® Instrumentation powered by INtools® is a Windows-based program that helps you to design and maintain every stage in the life-cycle of plant engineering systems, from construction, through maintenance and modernization, to de-commissioning.

This guide provides instructional, procedural, and reference material to help you get the most from SmartPlant Instrumentation. Use it to learn the basics and later as a reference to perform specific tasks.

SmartPlant Instrumentation is a straightforward, menu-driven program whose functions and modules are readily accessible from the menu and toolbars.

SmartPlant Instrumentation includes the following components:

- The Administration module, which provides all of the options required to define the administrative and security functions of the software. These options include defining access rights, managing preferences, creating the working environment, assigning managers, tag convention definitions, plant hierarchy item definitions, and so forth.
- SmartPlant Instrumentation Domain Explorer, which allows you to organize instrumentation items, easily navigate to them, and perform appropriate actions.
- The main SmartPlant Instrumentation Modules, which enable you to perform a wide variety of engineering activities.

The following utilities enable the transfer of external data into the SmartPlant Instrumentation database:

- The Import Utility provides the means to import data into SmartPlant Instrumentation from the most common database file formats such as Microsoft Access, DBF files, Oracle, SQL Server, Sybase Adaptive Server Anywhere, ASCII delimited files, and other ODBC compatible files.
- The Merger Utility provides the means of merging the data of either two <units> or two <plants> for the purpose of creating one common database for either the two <units> or the two <plants>.

Getting Started with SmartPlant Instrumentation User Assistance

SmartPlant Instrumentation user assistance supplies command information as you perform tasks. You can access different kinds of information any time you are running the software. This information could include reference topics, narrative descriptions or overviews.

SmartPlant Instrumentation offers the following important user assistance features:

Installation Guide — This document provides you with step- by-step procedures for installing SmartPlant Instrumentation on Oracle or SQL Server database platforms, or on Sybase Adaptive Server Anywhere. It also contains important configuration information, useful tips, and troubleshooting advice. The Installation Guide is presented in the .pdf file format and can easily be printed out. Adobe Reader, required for the .pdf files, is available for downloading from the Internet.

User's Guide — This document provides you with detailed information on **SmartPlant Instrumentation Explorer** and each SmartPlant Instrumentation module, along with recommended settings, examples, and useful tips. Also included in the User Guide are documents which deal with the usage of SmartSketch, AutoCAD, and MicroStation CAD interfaces and of InfoMaker and Microsoft Access report generators in SmartPlant Instrumentation.

Tutorial — The tutorial helps novice users acquire the skills necessary to start using SmartPlant Instrumentation, create a minimal setup for your plant, and all the basic instrument engineering activities for each module. You will acquire the fundamental understanding, skills, and practical experience that you need to use the software with confidence. The tutorial is presented in the .pdf file format and can easily be printed out. Adobe Reader, required for the .pdf files, is available for downloading from the Internet.

Online Help — SmartPlant Instrumentation Online Help provides conceptual overviews and procedures to help you to work efficiently with the software, as well as context-sensitive help for all windows and dialog boxes. Each context-sensitive help topic provides accurate reference information for the displayed window or dialog box.

To access context-sensitive help for an open window, do one of the following:

- On the **Help** menu of any SmartPlant Instrumentation module, click **SmartPlant Instrumentation Help**.
- On the toolbar, click the **Help** icon .

User Interface Features — The user interface provides you with several ways to see command descriptions:

- ToolTips help you find command names. When you pause the pointer on a toolbar icon, a yellow label displays the command name.
- Microhelp messages that appear at the bottom of the window inform you about the command you are going to execute. Pointing to a toolbar icon or selecting a menu option displays a brief message on the status bar.

Technical Support — Intergraph provides extensive technical support all over the world. To find out how to get technical support, click **About SmartPlant Instrumentation** on the **Help** menu and then click the **Tech Support button**.

Online Help Text Conventions

Special Displays

The following displays are used for features designed to capture your attention, such as warnings, important notes, and useful tips.

CAUTION Indicates a caution to which you should pay attention.

IMPORTANT Important information which supplements the main text.

NOTE General information which supplements the main text.

TIP Indicates a tip, pointing out a useful feature which makes life easier for the user.

Keyboard Conventions

Common functions of some keys are described below:

Keys	Example / description
Shortcut keys	Combinations of keys can be used as shortcuts. For example, Ctrl + F1 means hold down the Control key while pressing F1.
Tab	In windows and dialog boxes, pressing the Tab key activates the next field or command button. To activate the previous item, hold down the Shift key while pressing the Tab key.
Enter	In most windows and dialog boxes, pressing this key is equivalent to clicking the OK or Save command buttons.
Escape	In most windows and dialog boxes, pressing this key is equivalent to clicking the Cancel command button.
Arrow keys	Use these keys to move between fields in data tables.
Numeric keypad	If you have an extended keyboard, you can type numbers with the numeric keypad if you press Num Lock key to turn the Num Lock indication on.

Mouse Conventions

The left mouse button is the one referred to, unless otherwise stated.

To	Do this
Point	Position the pointer on an item.
Click	Point to an item, then quickly press and release the mouse button.
Double-click	Point to an item, then quickly press and release the mouse button twice.
Drag	Point to an item, and while holding down the mouse button on the item, move the item to a new location. When the pointer is at the desired location, release the mouse button.

Getting Started Common Tasks

The following general tasks are used when getting started:

Start SmartPlant Instrumentation

This procedure explains how to log on to SmartPlant Instrumentation, where to select the required domain and if the domain type is **Owner operator**, your project. After this, you navigate to the <unit> you are going to work in. Clicking **OK** on the **Open** dialog box brings you to the SmartPlant Instrumentation environment. For more information, see *Start SmartPlant Instrumentation* (on page 18).

Open a Different Domain

This procedure shows you how you can move from working in the current domain to a different one. For more information, see *Open a Different Domain* (on page 19).

Change the Logon Password

This procedure allows you to change the password that you use when logging on to SmartPlant Instrumentation. Changing SmartPlant Instrumentation logon passwords does not apply to users who log on to the software using Windows authentication logon method. For more information, see *Change the Logon Password* (on page 19).

Switch to a Different Unit

This procedure makes it possible to switch from the current <unit> to another <unit>. For more information, see *Switch to a Different Unit* (on page 20).

Open a Module

Use this procedure to open a specific SmartPlant Instrumentation module. You can open any module whether or not other modules are already open. Access to a particular module is subject to your having appropriate access rights. For more information, see *Open a Module* (on page 20).

Start SmartPlant Instrumentation

When starting SmartPlant Instrumentation, a splash screen appears, showing the current version number, followed by the **Logon Information** dialog box, where you select the required database and enter your user name and password. After logging on to SmartPlant Instrumentation, the software displays the **Open** dialog box, where you select the desired domain or project in an owner operator domain. After this, you navigate to the <unit> you are going to work in. Clicking **OK** on the **Open** dialog box brings you to the SmartPlant Instrumentation environment.

IMPORTANT

- User names and passwords are not case-sensitive. The software displays the password as asterisks.
- If you purchased SmartPlant Instrumentation with an evaluation license, there is no limit of the number of times that you can log on to SmartPlant Instrumentation before the expiration date of the license, however after that date, you will be denied access to SmartPlant Instrumentation.

Navigating in SmartPlant Instrumentation

You access SmartPlant Instrumentation items using the **SmartPlant Instrumentation Explorer**. Also, you perform various action from SmartPlant Instrumentation modules using the menu items or clicking the appropriate toolbar icons in the main SmartPlant Instrumentation window. A number of other options are available when you are in this window. The window itself consists of the following areas:

Menu bar — The menu bar contains access to all the actions you will perform in the module, and also to standard Windows features such as window layouts and Online Help.

Toolbar — The application toolbar provides you with quick access to each module. The module toolbars enable you to access the most common actions for the modules.

Application work area — The central region where the main module window appears.

Status bar — The status bar provides you with quick access to information on the selected icon or menu item (Microhelp) or the status of a particular process (for example, exporting data). In addition, it shows the plant hierarchy items and the current date and time.

Open a Different Domain

1. Close all SmartPlant Instrumentation modules that are open.
2. Click **File > Close**.
3. Click **File > Open**.
4. On the **Open** dialog box, select a domain .
5. If the project icon  appears (only when the domain type is Owner operator), double-click the icon to select the project you want to work with (As-Built or a project).
6. Navigate to a desired <unit> by double-clicking the <plant>  and <area>  icons to expand the view and display the <units>.
7. Select a <unit> by doing one of the following:
 - Double-click the <unit>  icon.
 - Click the <unit> once to highlight it, then click **OK**.

Change the Logon Password

IMPORTANT

- The System Administrator has rights to set logon passwords for SmartPlant Instrumentation users and is able to override any password changes made by other users. Therefore, after changing the password, you must inform the System Administrator of such a change.
 - Changing SmartPlant Instrumentation logon passwords does not apply to users who log on to the software using Windows authentication logon method.
1. Click **File > Change Password**.
 2. In the **Current** password field, type your current logon password.
TIP Passwords appear masked.
 3. In the **New password** field, type the new password.
TIP You can use alphanumeric values in either upper or lower case. The maximum length of your password can be 15 characters.
 4. In the **Confirm new password** field, retype the new password.
 5. Click **OK**.

Switch to a Different Unit

1. Close all SmartPlant Instrumentation modules that are open.
2. On the main toolbar, click .
3. On the **Open** dialog box, expand the <plant> and <area> hierarchies and navigate to the <unit> you require.
4. Select a <unit> by doing one of the following:
 - Double-click the <unit>  icon.
 - Click the <unit> once to highlight it, and then click **OK**.

Open a Module

1. Start SmartPlant Instrumentation.
2. Do one of the following:
 - Click the appropriate toolbar icon for the module you want to open.
 - On the **Modules** menu, click a desired module name.

SECTION 2

Preferences

This section contains topics relating to the use and setting of the various SmartPlant Instrumentation preferences. The preferences control the way the software displays items, stores data, interacts with different items and much more. Some of these preferences, such as temporary data paths, must be set for the software to function correctly.

Display and Customize Preferences

Use this procedure to display the default preferences or set your own preferences in SmartPlant Instrumentation. Your preference settings do not affect the preferences that were defined by other users in the current domain or working in the current project, if the domain type is **Owner operator**

IMPORTANT

- Domain Administrators have additional options that allow preferences management from the Administration module.
- Certain interface options are governed by the Intools.ini file.

1. Click **File > Preferences**.
2. In the tree view, beside a desired module, click  to expand the hierarchy.
3. Click an option to open a specific page where you can view or customize preferences.

NOTE

The Domain Administrator can restrict the ability of other users to set their preferences. Therefore, you may find that you can only view certain options but not change their values.

Preferences Governed by the .INI File

Use this topic discusses the various preference settings that you can make in the Intools.ini file.

Intools.ini

Document Number and Revision Level Segregation — In the **Instrument Index Standard Browser**, when you make a document revision in one <unit> and then log on to another <unit>, both <units> share the same document number and set of revisions. To specify a separate document number and set of revisions for the current <unit>, open the Intools.ini file, and under the [Index] section, type the following line:

DrawingPerLevel = Y

This setting is needed if, for example, you are publishing documents from different <units>.

Filter Setting — When you specify a filter setting such as a data range, and then restart the software, the software updates the date range in every SmartPlant Instrumentation module in which you use the same filter.

ID of the <Unit> Selected Last — When you select a specific <unit> on the **Open** dialog box, the software records the <unit> ID in the Intools.ini file under the [Project] section. The next time you start SmartPlant Instrumentation and display the **Open** dialog box, the software displays the <unit> you selected last.

Performance when Generating Enhanced Reports — Sometimes, the response time between the application server and the database server is very slow when generating enhanced reports. To improve this performance, open the Intools.ini file, and under the [Loop] section, change the value of the DDETimeOut parameter to 20000. This parameter has units of milliseconds.

Suppression of Loop Equipment Propagation to Tag Numbers by Default — When you create a new loop, you can specify whether to apply the P&ID, service, and equipment to tag numbers. By default, these options are selected; however, you can specify not to propagate these values to tag numbers that you subsequently associate with the loop. To do so, open the Intools.ini file, and under the [Index] section, type the following line:

LoopNoPropagateCheck = 1

This setting prevents the software from removing the equipment reference from tag numbers that you associate with a loop that has no equipment reference.

X and Y Positions of Certain Windows and Dialog Boxes — If you move a certain window or dialog box in the screen area, the software saves the X and Y positions of the window or dialog box in the Intools.ini file under the [Project] section. This only applies to a small number of windows and dialog boxes.

Smartloop.ini

Hiding Macro Items when Generating Enhanced Reports — If, for a default macro such as a panel name, you define a filter that hides a particular macro, a dot appears in place of the macro. The dot is needed to allow editing of the macro filter, adding new macros to the item associated with the hidden macro, or editing of the item. If you want to hide the dots, for example when printing the report or saving it in a different format, you need to define the parameter HidelItems = Y in the Smartloop.ini file.

Preferences Dialog Box

Customizing preferences allows you to automate a number of procedures. Your preference settings do not affect the preferences that were defined by other SmartPlant Instrumentation users in the current domain or working in the current project, if the domain type is **Owner operator**.

The Domain Administrator can restrict the ability of other users to set their preferences. Therefore, you can find that certain options are disabled. If you want to enable these options, contact your Domain Administrator, who can manage preferences from the Administration module.

Tree view — Click  beside a desired module to expand the hierarchy, and then click an option to open a specific page where you can set your preferences.

Pages — Using the options on the pages, you can view the default preferences set by the Domain Administrator. Also, you can overwrite certain default preferences with your own settings, provided that the Domain Administrator has not disabled these preferences.

Reset — Resets all the properties for the selected module to their default values. This option appears when you select a module or some of the other categories such as **Enhanced Reports**, **Interfaces**, or **SmartPlant**, at the highest level of the tree view.

Reset all — Resets all the properties in the **Preferences** dialog box to their default values.

Import — Imports the domain/project preferences from the intools.ini file.

Export — Saves the domain/project preferences to an external .dmp or .txt file.

The options on the **General** page of the **Preferences** dialog box enable you to customize the SmartPlant Instrumentation interface and set general application preferences. These settings do not affect the preferences that were defined by other SmartPlant Instrumentation users in the current domain or working in the current project, if the domain type is **Owner operator**.

When customizing the general preferences, you can:

- Set the default locations of the main toolbar and the module toolbar.
- Set the toolbar and icon display.
- Automatically start SmartPlant Instrumentation with the unit and module you last worked in.
- Set print preview options.
- Overwrite the default logo.

Note that the Domain Administrator can restrict your ability to set various preferences. Therefore, you can find that certain options are disabled. If you want to enable these options, contact your Domain Administrator, who can manage preferences from the Administration module.

Select toolbar — Allows you to select the toolbar whose display options you want to define: **Main Toolbar** or **Module Toolbar**.

Show toolbar — Makes the currently selected toolbar visible in the application. Clear the check box to hide the toolbar.

Toolbar position — The following options enable you to set the toolbar the position on your screen. Click the desired option:

- **Top** — Places the selected toolbar along the top of the screen right under the menu bar.
- **Bottom** — Places the selected toolbar along the bottom of the screen.
- **Floating** — Makes the selected toolbar float on your screen.
- **Right** — Places the selected toolbar along the right edge of the screen.
- **Left** — Places the selected toolbar along the left edge of the screen.

Automatic start of the last module — Starts SmartPlant Instrumentation automatically in the lowest level plant hierarchy item in which you last worked. After you select this check box, the software bypasses the **Select Unit** dialog box and automatically opens the last module that you worked in. If several modules were open when closing SmartPlant Instrumentation, the software treats the active module as the last one.

Overwrite logo — Retrieves automatically the current logo from the database and overwrites the projlogo.bmp file in the [SmartPlant Instrumentation home folder]\temp folder. The projlogo.bmp file is from where SmartPlant Instrumentation takes the logo which is used in documents and reports. If you clear the check box, the software retrieves the logo from the original bitmap file – in this way the projlogo.bmp file is not changed when switching to another domain, so that you use the same logo. Clearing the check box also speeds up your work.

Print preview options — The following options enable you to set a print preview option for report generation.

- **Always** — Opens print previews automatically, without prompting you for confirmation.
- **Never** — Automatically spools reports to the output device, without prompting you for confirmation.
- **Ask user** (default) — Prompts you to open a report print preview before printing.

Current report preview options — The following options enable you to compare a new report displayed in the **Print Preview** window with an existing archived report.

- **Mark changes only** — Marks the changes in the print preview of a new report, if the currently previewed report is different from the archived report.
- **Generate changes report only** — Generates a changes report after comparing a new report with an archived report.

- **Mark changes and generate changes report** — Generates a changes report after comparing a new report with an archived report and marks the changes in the print preview of the new report.

Display license expiration reminder ... days in advance — Allows you to specify the number of days (between 1 and 37) prior to license expiration that the software will display an advance warning.

Temporary folder path — Allows you to specify the path to the SmartPlant Instrumentation temporary folder where the software stores the temporary logo and custom files. Click **Browse** to navigate to the path.

For example:

C:\Program Files\SmartPlant\Instrumentation\TEMP

In the temporary folder, the software creates temporary files during various activities that you perform in SmartPlant Instrumentation. For example, when you create specifications, generate CAD drawings, hook-up drawings, or reports, and so forth.

NOTES

- In the Specifications module, when you generate the **Spec Forms** report, the software generates the report as the specprn.psr file and saves this file to the folder you specify in the **Temporary folder path** box. If you leave this box blank, the software saves the specprn.psr file to the SmartPlant Instrumentation home folder and not to the **PSR working folder** path preference (on the **Specifications > Export/Import** page).
- If your CAD application is MicroStation, make sure the path string does not exceed fifty two characters. A longer path prevents MicroStation from generating or displaying drawings or cells from SmartPlant Instrumentation.
- If the System Administrator specified a global path in your domain, the global path does not apply to the temporary folder path.

Output document folder — Enables you to specify the path to the folder where the software generates IDEAL report files. Click **Browse** to navigate to the path.

Copy File Locations Dialog Box

This dialog box allows you to copy the file locations from one Enhanced Reports module to another, for example; from **Enhanced Loop File Locations** to **Cable Layout File Locations**.

Copy from — Choose from the list the enhanced report that you want to copy the file locations from.

Copy to — Choose from the list one or more enhanced reports that you want to copy the file locations to.

Select all — Select this option when you want to copy the file locations from one enhanced report to all the enhanced reports.

Interfaces > DCS Vendors (Preferences)

Use this option while preparing SmartPlant Instrumentation data that you want to publish for the DCS vendor (such as DeltaV, Yokogawa)

DCS vendor options

Fieldbus mode — Determines whether you can work with fieldbus devices you created in SmartPlant Instrumentation or with fieldbus devices you downloaded to SmartPlant Instrumentation. Select this check box if you are preparing fieldbus data for publishing to the DCS vendor software. When the check box is selected, on the **Fieldbus** tab of the **Tag Number Properties** dialog box, the contents of the fieldbus device revision list is limited according to the manufacturer that you select on the **General** tab. Your selection of manufacturer and fieldbus device revision then determines function block association for a given instrument. The software displays only those function blocks that belong to the downloaded fieldbus devices and makes the Function Blocks supporting table inaccessible.

If you clear this check box, you can work with function blocks you create in SmartPlant Instrumentation. The software hides function blocks belonging to fieldbus devices you previously downloaded.

Claim and Merge Options (Preferences)

The options on this page only apply in an owner operator domain. These options allow you to set preferences for claiming As-Built items for a project from SmartPlant Instrumentation or merging project data with As-Built. When working with As-Built data, you can either claim items directly or copy them to the **Claim Buffer**. Then, your Project Administrator can claim these items in the Administration module. When working in a project, you cannot merge items directly. It is only possible to copy project data to the Administration module **Merge Buffer** for merging.

These preferences determine how the software claims, merges, or copies to the **Claim Buffer** or **Merge Buffer** the sub-items and parent items associated with the items you select for claiming or merging from the Explorer windows. Documentation dealing with claiming and merging data appears in the Administration module Help. For common tasks associated with claiming data, see Scoping Data for Projects Common Tasks in the *Administration User's Guide*. For common tasks associated with merging data, see Merging Project and As-Built Data Common Tasks in the *Administration User's Guide*.

The following table shows the related data or items that the software can include in the **Claim Buffer** or **Merge Buffer** when you select a main item belonging to a specific item type.

Main Item	Related Items/Data Included with the Main Item
Loop	Tags with basic engineering data (process data, calculation, calibration, dimensional data for piping, and specification sheets, hook-up associations), wiring items that have a signal propagated to the loop or tag. If you placed a device panel inside a cabinet or junction box, when claiming the loop, this device panel is not claimed or merged together with the cabinet or junction box because this device panel does not have a signal propagated to the loop. You must claim or merge such a device panel manually.
Instrument	Basic engineering data, wiring items that have a signal propagated to the instrument.

Main Item	Related Items/Data Included with the Main Item
Wiring item (panel, rack, wiring equipment, and so forth)	All wiring sub-items and control system tags that appear in the appropriate wiring item folder in the Domain Explorer .
Terminal strip	Terminals
Cable	Cable sets, wires
Wire	Cables, cable sets

NOTES

- The **Claim Buffer** and **Merge Buffer** are only accessible from the Administration module. For more information about the **Claim Buffer**, see the Administration module Help, Claim Buffer in the *Administration User's Guide*. For more information about the **Merge Buffer**, see the Administration module Help, Merge Buffer in the *Administration User's Guide*.
- Preferences that you set do not affect preferences the Project Administrator defines on the **Preferences for Scoping and Merging Data** dialog box of the Administration module.

Include when claiming or merging items

- **No sub-items** — Affects only items you selected in an Explorer window. The associated sub-items are neither claimed nor copied to the buffer as dummy items.
- **Sub items** — Allows you to claim, merge, or copy to the buffer the associated sub-items. After you select this option, you can select any combination of the check boxes if you want the software to include wiring data when you perform a desired claim or merge operation using shortcut menu commands of an Explorer window.

For example, if you do not select any check box, and then, in the **Domain Explorer**, select a loop or a tag, the software includes all the engineering data but does not include any wiring items that have a signal propagated to the loop or tag. The engineering data that the software includes consists of process data, calculation, calibration, dimensional data for piping, and specification sheets, and hook-up associations. To include these wiring items, you must select the **Wiring data of tags and loops** check box.

NOTE When you select a tag for claiming or merging, the basic engineering data is selected automatically. You cannot claim or merge a specific instrument, process data sheet, and so forth.

Wiring data of tags and loops — Allows you to claim, merge, or copy to the buffer all the wiring items that have a signal propagated to the tags and loops you select for claiming.

Tags and loops with lowest level sub-items only — Only available after you select **Wiring data of tags and loops**. Allows you to claim, merge, or copy to the buffer only the terminals and wires that have a signal propagated to the tags and loops you select for claiming. The intermediate sub-items are processed as dummy.

Wiring equipment sub-items — Only available after you select **Wiring data of tags and loops**. Allows you to claim, merge, or copy to the buffer all the wiring items that are associated with wiring equipment. For example, if you claim a tag associated with an apparatus, the software also claims all of the sub-items associated with the apparatus.

Non-connected terminals and spare wires — Only available after you select **Wiring data of tags and loops**. Allows you to claim, merge, or copy to the buffer the non-connected terminals and spare wires together with the other associated wiring items that have a signal.

Wires connected to terminals — Allows you to claim, merge, or copy to the buffer all the wires that are connected to terminals associated with the parent items. For example, if you claim a panel, the software also claims the panel strips, the terminals, and the wires that are connected to the terminals.

NOTE If you selected a loop or tag, and also selected the **Wiring data of tags and loops** check box, the **Wires connected to terminals** check box does not apply to the wiring items associated with the loop or tag. In this case, the software always claims, merges, or copies to the buffer all the wires that have signal propagated to the tag.

When claiming items, include parent items as

Specifies the way the software handles parent items when you claim items to a project.

- **Dummy items** — Allows you to claim or copy to the **Claim Buffer** parent items as dummy items. For example, if you claim an instrument, the source loop number appears in the project as a dummy item.
- **Fully-functional items** — Allows you to claim or copy to the **Claim Buffer** parent items as fully-functional items. For example, if you claim an instrument, the source loop number appears in the project as a fully-functional item.

NOTE When you claim instruments directly from the **Instruments** folder of the Domain Explorer, the source loop is always claimed as a dummy item, regardless of the value of this setting.

When merging items, leave parent items in project as

Specifies the way the software handles parent items when you merge items created in a project back to the As-Built.

- **Dummy items** — When the Project Administrator merges back to the As-Built items that were created in the project, and this option is selected, the software removes the merged items from the project and leaves the parent items in the project as dummy items. For example, when merging a terminal strip, the terminal strip is removed from the project and the parent panel remains in the project as a dummy panel. However, if after merging the terminal strip, the panel has no other sub-items in the project, the software also removes the panel.
- **Fully-functional items** — When the Project Administrator merges back to the As-Built items that were created in the project, and this option is selected, the software removes the merged items from the project and leaves the parent items in the project as fully-functional items.

NOTE If, in the project, you created a single item that has a parent item, and you merge that single item into the As-Built, the parent item remains in the project as a fully-functional item, regardless of the value of this setting.

Copy revision data — Includes revision data of the documents associated with items that you claim.

Reclaim items — Allows you to claim the same items again. When an item exists in a project, reclaiming the item results in an automatic update of the project item properties, connections and associations. If you deleted an item, this item reappears in the project after reclaiming.

Report Generator (Preferences)

The options on the **Report Generator** page enable you to select whether to use the default report generator InfoMaker. This setting does not affect the preferences that were defined by other SmartPlant Instrumentation users working in the current domain or, if the domain type is **Owner operator**, in the current project.

Default report generator

Report generator — Select an option: **InfoMaker** or **None**.

Report generator program path — Type the full path and filename or click **Browse** to navigate to the InfoMaker executable file.

SmartPlant Instrumentation Server (Preferences)

These options enable you to specify preferences when using the SmartPlant Instrumentation Server.

Enhanced report format — Enables you to specify the file type when generating enhanced reports using IDEAL. Available options are:

- **SMA** — Generates files in the native format of the Enhanced Report Utility.
- **PDF** — Generates files as PDF output.

Log file path — Enables you to specify the path to the folder where the software creates the log file output. Click **Browse** to navigate to the path. Note that if no path is defined or the path definition is invalid, the software generates the log file in the Temp folder defined in Windows.

Module Icons (Preferences)

These options enable you to customize the main toolbar by adding, removing, and rearranging the icons on the main toolbar in any sequence. These settings do not affect the preferences that were defined by other SmartPlant Instrumentation users in the current domain or working in the current project, if the domain type is **Owner operator**.

The Domain Administrator can restrict the ability of other users to set their preferences. Therefore, you can find that certain options are disabled. If you want to enable these options, contact your Domain Administrator, who can manage preferences from the Administration module.

NOTES

- An icon cannot appear on the main toolbar more than once.
- You cannot change the original icon assignment.
- You cannot modify the icon image.

Placing an icon on the main toolbar

Do one of the following:

- Drag an icon from the **Available icons** pane and drop it in the **Selected icons** pane.
- Double-click an icon or its name in the **Available icons** pane.
- Select an icon and click **Add**.

Removing an icon from the main toolbar

Do one of the following:

- Drag an icon from the **Selected icons** pane and drop it in the **Available icons** pane.
- Double-click an icon or its name in the **Selected icons** pane.
- Select an icon and click **Remove**.

General Features

This section contains information about various general topics that are used when working in SmartPlant Instrumentation.

SmartPlant Instrumentation Data Model

The data model is the persistent storage structure for data manipulated by SmartPlant Instrumentation.

The SmartPlant Instrumentation Data Model Excel spreadsheet is a two-dimensional representation of the SmartPlant Instrumentation data model. This spreadsheet lists item types, item properties, and data types, as well as all the constructed item attributions that apply to Instrumentation objects. This list is alphabetical according to item type. The file can be found in the home folder where you have installed SmartPlant Instrumentation.

Searching for Tag and Loop Numbers

SmartPlant Instrumentation provides you with several options to find the tag and loop numbers that you require to work with.

You can look for your tag and loop numbers in the SmartPlant **Instrumentation Explorer** or you **can** use the search facilities provided in the pertinent modules. For more information, see *Search for Items in SmartPlant Instrumentation Explorer* (on page 542).

While working in a module, you can search for tag or loop numbers in different ways. You can enter search parameters and find tag or loop numbers that match the search parameters that you specified. If you do not specify any search parameters, the software finds all the existing tag or loop numbers in the current <unit>. In the Process Data and Calibrations modules, you can search for tag numbers either in the current <unit>, or in all the <units> of the current <plant>. You can also look for typical tags created in the current domain.

You search for tag numbers in the **Find Tag** dialog box. There are many cases where the software opens the **Find Tag** dialog box. You can look for tag numbers after clicking **Find** in dialog boxes that prompt you to enter a tag number. Also, you can look for tag numbers when opening a process data sheet, when editing, duplicating, or deleting a tag number, or when calculating or calibrating tag numbers, and so forth.

You search for loop numbers in the **Find Loop** dialog box. The software opens the **Find Loop** dialog box whenever you need to search for a loop number. There are many cases where the **Find Loop** dialog box opens: clicking **Find** in a dialog box that prompts you to enter a loop number opens the **Find Loop** dialog box. For example, you can click **Find** when you want to edit or duplicate one or more loop numbers in the Instrument Index module.

Search for All Tag Numbers

This topic explains how to find all the existing tag numbers in the current <unit>. In the Calibration and Process Data modules, you can search for tag numbers in all the <units> of the current <plant>. In the Process Data module, you can find tag numbers in all units when searching for tag numbers to generate instrument reports.

1. In the **Find Tag** dialog box, do not enter any other values in the **Search parameter** fields.

TIP In the Calibration or Process Data module, select **Look in the entire current plant** if you want to find tags in all the <units> of the current <plant>.

2. Click **Find**.

TIP Select the **Show more search results** check box to hide the search parameter fields and enlarge the **Search results** data window to display more tag rows. Clear this check box to return to normal view.

3. Select the required tag numbers in the **Search results** data window and click **OK**.

Use Search Parameters to Find Tag Numbers

This help topic explains how to find tag numbers by entering search parameters.

Entering search parameters in the **Find Tag** dialog box enables you to narrow down your search. You can narrow your search to the maximum by entering all the search parameters. It is up to you what search parameters to specify. You can use wildcards in the fields where you type values.

Leaving some of the **Search parameter** fields empty widens the search. If you do not specify any search parameters, the software finds all the existing tag numbers.

After the search is complete, the software displays the tag numbers that match your search parameters in the **Search results** data window.

1. In the **Find Tag** dialog box, from the **Tag class** list, select the desired tag class.

TIP A conventional tag is an instrument that does not belong to the **Fieldbus**, **Telecom**, **Typical**, or **Electrical** classes.

2. Use the following fields and lists in the **Search** parameters group box for search parameters that narrow your search:

Search Parameter	Explanation	Example
Tag Number	Type the whole tag number you are looking for. Include any prefix, suffix, and separator characters. You can use wildcards if needed.	101-FT-2225/1 Or use a wildcard 101- FT%
Process function	Select a process function to narrow your search to tags belonging to the selected process function. This parameter is available in the Instrument Index and Process Data modules only.	Flow Pressure
Instrument type	Select an instrument type to narrow your search to tags belonging to the selected instrument type.	D/P Type Flow Element (FE), Mass Flow Transmitter (FT)

Search Parameter	Explanation	Example
Status	Select a tag status to narrow your search to tags associated with the selected status.	An existing device, a new instrument, a relocated device
Location	Select a tag location, for example, Field, to narrow your search to tags for which you have defined this location.	Equipment room, junction box
I/O type	Select a I/O type to narrow your search to tags for which you have defined this I/O type.	AO (analog output) DI (Digital input)
Prefix	Type the tag number prefix to find all the tag numbers that have this prefix in their names. Do not include the separator characters. The <unit> number segment in the tag number name is usually the tag number prefix. You can also use wildcards if needed.	101
Number	Type the numeric segment of a tag number to find all the tag numbers that have this numeric segment. You can also use wildcards if needed.	2315
Suffix	Type the suffix segment of the tag number to find all the tags that contain this suffix. Do not type the slash (/) character. You can also use wildcards if needed.	1 (the number following the slash (/) in tag number 101–FT–2225/1)
Equipment	Select equipment to narrow your search to tags for which you have defined this equipment.	
Line	Select a line to narrow your search to tags with which you have associated this line. This parameter is not available in the Process Data and Specifications modules.	
Form number	Select a specification form number to narrow your search to tags for which you have defined this form number. This parameter is available in the Specifications module only.	
Date range	Type dates or use spinners to narrow your search to a given date range. This parameter is available in the Specifications module only.	

- To broaden the search to include all of the <units> in a given <plant>, select **Look in the entire <plant>**.

TIP This field is available in the Calibration module, and in the course of various procedures in the Process Data and Specifications modules.

4. Click **Find**.

TIP Select the **Show more search results** check box to hide the search parameter fields and enlarge the **Search results** data window to display more tag rows. Clear this check box to return to normal view.

5. In the **Search results** data window, do one of the following:

- Select the desired tag number.
- Press and hold down **Ctrl** to select multiple tag numbers.
Multi-selection is available in the Calculation module when you select tags for batch calculation, in the Process Data module for instrument report generation, and in the Specifications module. You can also select the **Select all** check box to select all the displayed tag numbers.

6. Click **OK**.

NOTE To specify search parameters in the Calibration module, you need to perform a separate procedure. For details, see Searching for Tag Numbers in the Calibration Module.

Search for Typical Tags

This help topic explains how to find all the existing typical tag numbers in the current domain. You perform the search in the Instrument Index module.

NOTE It is possible to search for typical tags only in the Instrument Index module.

1. When editing, deleting, duplicating or moving tags in the Instrument Index module, in the **Enter Tag Number** dialog box, click **Find**.
2. In the **Find Tag** dialog box, select **Typical tag** from the **Tag class** list.
3. Do not enter any other values in the **Search parameter** fields.
4. Click **Find**.

TIP Select the **Show more search results** check box to hide the search parameter fields and enlarge the **Search results** data window to display more tag rows. Clear this check box to return to normal view.

5. Select the desired tag numbers in the **Search results** data window and click **OK**.

Search for All Loop Numbers

This topic explains how to find all the existing loop numbers in the current <unit>.

1. In the **Find Loop** dialog box, do not enter any other values in the **Search parameter** fields.
2. Click **Find**.

TIP Select the **Display more results** check box to enlarge the **Search results** data window and display more rows. Clear this check box to return to normal view.

3. Select the required loop numbers in the **Search results** data window and click **OK**.

Use Search Parameters to Find Loop Numbers

This help topic explains how to find loop numbers by entering search parameters.

Entering search parameters in the **Find Loop** dialog box enables you to narrow down your search. You can narrow your search to the maximum by entering all the search parameters. Leaving some of the **Search parameter** fields empty widens the search. It is up to you which search parameters to specify. If you do not specify any search parameters, the software finds all the existing tag numbers in the current <unit>. Note that you can use wildcards in the fields where you type values.

After the search is complete, the loop numbers that match your search parameters are displayed in the **Results** data window.

Use the fields and lists in the **Search parameters** group box to enter your search parameters to narrow your search. The following search parameters are available:

Search Parameter	Explanation	Example
Loop name	Type the whole loop number you are looking for. Include any suffix, and separator characters. You can use wildcards if needed. The Search Results data window will display this loop number if it exists.	101F –2225VA 101F–%
Loop number	Type the numeric segment of the loop number to find all the loop numbers that have this numeric segment. You can also use wildcards if needed.	2225
Loop suffix	Type the suffix segment of the loop number to find all the loops that have this suffix. You can also use wildcards if needed.	A
Measured variable	This search parameter is used to find all the existing loop numbers that have the measured variable that you select from this list.	Density (D) Pressure (DP)
Loop type	This search parameter is used to find all the existing loop numbers that have the loop type that you select from this list.	Electrical Loop (Electrical) Open Loop (Open)
Loop function	This search parameter is used to find all the existing loop numbers that have the loop function that you select from this list.	Indication and Alarm (IA) Control (C)
Generation type	This search parameter is used to find all the existing loop numbers that used a specific type of loop drawing generation.	CAD (a loop drawing generated by an external CAD engine) Manual (a loop drawing generated by using the manual method)

1. If required, select the **Fieldbus** check box to narrow your search to the loop numbers that contain tags with a fieldbus I/O type.
2. Click **Find**.

3. Select one or more loop numbers in the **Search results** data window.

TIPS

- The **Select all** option is not available when duplicating an existing loop number.
- Select the **Show more search results** check box to hide the search parameter fields and enlarge the **Search results** data window to display more loop rows. Clear this check box to return to normal view.

4. Click **OK**.

Search for Typical Loops

This help topic explains how to find all the existing typical loops in the current unit.

Using the **Typical Loop Management** dialog box:

1. Click **Edit > Typical Loop Management**.
2. In the **Find typical loop** field, type the name of the typical loop you want to find. As you type the software highlights the typical loop names in the data window.

Using the **Batch Loop Creation** dialog box:

1. Click **Edit > Batch Loop Creation**.
2. Click **Find**.
3. In the **Find Typical Loop** dialog box, do one of the following:
 - Enter the required search parameters, and click **Find**.
 - Click **Find**, and from the **Search results** data window, select the required typical loop.

Supporting Tables

Supporting tables are dialog boxes that allow you to manage the contents of select lists in SmartPlant Instrumentation. For example, when creating or editing a panel, the values that you select from the lists are held in the relevant supporting tables.

To access a supporting table, click  next to the list arrow in the relevant dialog box, or when in the **Wiring Module** or **Instrument Index Module** window, click **Tables** and then the relevant menu command.

Note that in a multi-user installation, SmartPlant Instrumentation allows only one user at a time to edit a given supporting table record.

For a detailed list and description of all the supporting tables in the SmartPlant Instrumentation, see *Supporting Tables in SmartPlant Instrumentation* (on page 35).

Supporting Tables in SmartPlant Instrumentation

The following table lists all the available supporting tables and the description of their functions. You can access these supporting tables by clicking  next to a list arrow or by clicking an appropriate command on the **Tables** menu in the Instrument Index and Wiring modules.

Supporting Table	Description
General Process Function Sub-Categories	Allows you to define a sub- category for the General process function in the Instrument Types dialog box.
Instrument Statuses	Allows you to maintain the contents of the Status select list on the Tag Number Properties dialog box.
I/O Types	Allows you to maintain the contents of the System I/O type list on the Tag Number Properties dialog box.
Instrument Locations	Allows you to specify general or specific instrument locations within the <plant>.
Equipment	Allows you to categorize the equipment that your instruments are installed on. Equipment is also categorized according to different types, for example, you can specify the equipment type as: pumps, compressors, burners, silos, and so forth.
Equipment Types	Allows you to add new equipment types to the Equipment type select list in the Equipment dialog box. You can categorize the equipment that your instruments are installed on according to different types, such as pumps, compressors, burners, silos, and so forth.
P&ID Drawing References	Allows you to store P&ID drawing references used for making associations with tag numbers in the Instrument Index and Loop Drawings modules.
Lines	Allows you to categorize and modify line data in your <plant>. This dialog box also enables you to access the Line Properties dialog box where you can create a new line or edit the properties of an existing line.
Line Types	Allows you to create, view, edit, and delete line types.
Instrument Criticality	Allows you to customize instrument criticality data. Then, you can define criticality for a particular tag in the Associate Categories and Criticality dialog box that you access from an Instrument Index Standard Browser view.
Instrument Certification	This supporting table holds certification information for instruments that are certified for hazardous environment.

Supporting Table	Description
Instrument Manufacturers	Allows you to control the content of the Manufacturer lists in the Tag Number Properties and Find Tag dialog boxes as well as the Manufacturer column in an Instrument Index Standard Browser view. The URL feature on the Instrument Manufacturer dialog box allows you to enter a desired URL that can be double-clicked to automatically launch the Internet Explorer and go to the pertinent Web site if you are connected to the Internet.
Instrument Models	Allows you to store instrument model data in the current domain. All instrument models are categorized by instrument manufacturer.
Function Blocks	Allows you to add new user- defined function blocks to your instrument index, delete the redundant ones, or modify the definition of existing user- defined function blocks.
Intrinsically Safe Circuit Types	Allows you to create and manage intrinsically safe circuit types which you can associate with tag numbers while editing tag number properties. The intrinsically safe circuit types that are held in this supporting table then become available in the Wiring module where you can carry out the intrinsic safety calculation.
Loop Measured Variables	Allows you to enter or modify the loop process variable identifier which is used in the loop naming conventions.
Loop Types	Allows you to maintain the contents of the Loop type select list on the Loop Number Properties , Typical Loop Properties , and Find Loop dialog boxes.
Loop Functions	Allows you to enter or modify the loop function identifier which is used in loop naming conventions. The loop function identifier is used to identify the succeeding letters that follow the loop measured variable identifier in the loop name.
Associated Electrical Equipment	Allows you to view equipment tags that are associated with signals that are defined in SmartPlant Electrical and the equipment type to which each signal belongs.
Associated Electrical Equipment Types	This supporting table holds all the available associated electrical equipment types to which SmartPlant Electrical signals can belong.
Circuits	This supporting table holds circuit values that appear in the Circuit list on the Electrical tab of the Tag Number Properties dialog box.
Rated Voltage	This supporting table holds rated voltage values that you can use in the Rated voltage list on the Power Supply tab of the Tag Number Properties dialog box.
Frequency	This supporting table holds frequency values that you can use in the Frequency list on the Power Supply tab of the Tag Number Properties dialog box.
Number of Phases	This supporting table holds number of phases values that you can use in the Number of phases list on the Power Supply tab of the Tag Number Properties dialog box.

Supporting Table	Description
Operating Modes	This supporting table holds operating mode values that you can use in the Operating mode list on the Power Supply tab of the Tag Number Properties dialog box and the properties dialog boxes of panels that support power supply. SmartPlant Instrumentation provides you with pre-defined operating modes (Continuous, Intermittent, Spare, and Standby), which are the only values that are recognized by SmartPlant Electrical. You cannot delete or modify these values.
Signal Types	This supporting table holds signal type values that are used to define HART instrument properties. To fill this table, you need to download DeltaV definitions.
Linearity Types	This supporting table holds linearity type values that are used to define HART instrument properties. To fill this table, you need to download DeltaV definitions.
Panel Types	Allows you to maintain the contents of the Panel type list when editing the properties of a panel.
Panel Manufacturers	Allows you to customize the options on the Manufacturer list on the Properties dialog boxes listed below. The URL field on the Panel Manufacturer dialog box allows you to enter a desired URL. You can then double-click this URL to automatically start the Internet Explorer and go to the pertinent Web site if you are connected to the Internet. This supporting table also allows you to define field headers that use manufacturer-specific terminology.
Panel Models	Allows you to manage the contents of the Model list when creating or editing a panel. SmartPlant Instrumentation classifies panel models according to manufacturer. You can find the data used in the other columns in the manufacturer's catalog. Note that selecting a different model does not change any other data.
Panel Area Classifications	Allows you to manage the data contained in the Area classification list on any of the panel properties dialog boxes.
Terminal Strip Types	Allows you to manage the data contained in the Type list on the Terminal Strip Properties dialog box. You can use this dialog box to categorize a terminal strip where the terminal strip represents a hardware device or a DCS/PLC I/O termination.
Terminal Strip Manufacturers	Allows you to manage the contents of the Manufacturer list on the Terminal Strip Properties dialog box.
Terminal Strip Models	Allows you to manage the contents of the Model select list on the Terminal Strip Properties dialog box. SmartPlant Instrumentation classifies terminal strip models according to manufacturer. You can classify a terminal strip model/MFG for control si/s cards and hardware devices.

Supporting Table	Description
Terminal Types	Allows you to manage the contents of the Type select list on the Terminal Properties dialog box. Also, you can classify the terminals whenever their type needs to be defined. You can replace the default graphic image of terminal sides that appear in the Connection window and the appropriate reports.
Terminal Manufacturers	Allows you to manage the contents of the Manufacturer select list on the Terminal Properties dialog box.
Terminal Models	Allows you to manage the contents of the Model select list on the Terminal Properties dialog box. Terminal models are classified according to manufacturer.
Terminal Colors	Allows you to manage the contents of the Color select list on the Terminal Properties dialog box. You can also select and customize the graphical representation of the color names defined in this supporting table. This sets the precise colors for the bar connecting terminals in the Connection and Cross-Wiring windows.
Wiring Equipment Types	Allows you to manage the contents of the Wiring equipment types select list. Wiring equipment type is one of the properties used to define wiring equipment items, such as I/O cards, I/O terminations, fieldbus bricks, safety barriers, relays, amplifiers, and so forth.
Wiring Equipment Manufacturers	Allows you to manage the contents of the Manufacturers select list. Wiring equipment manufacturer is one of the properties used to define wiring equipment items, such as I/O cards, I/O terminations, fieldbus bricks, safety barriers, relays, amplifiers, and so forth.
Wiring Equipment Models	Allows you to manage the contents of the Models select list. Wiring equipment model is one of the properties used to define wiring equipment items, such as I/O cards, I/O terminations, fieldbus bricks, safety barriers, relays, amplifiers, and so forth.
Wiring Equipment Category	This supporting table holds wiring equipment category values. The categories that exist in this supporting table are available for selection in the Categories select list of the New Wiring Equipment dialog box. You can add your own categories and then set their properties as you require. However, you cannot modify or delete the categories that are supplied to you with the software.
Cable Types	Enables you to manage cable type data that appears on the Cable Properties dialog box, Type select list. The Cable Types dialog box holds all the data that pertains to the cable types in the current <plant>. Users can view the data or delete it as needed. This dialog box provides access to the Cable Type Properties dialog box, where you can create a new cable type or edit the properties of an existing cable type.
Cable Manufacturers	Enables you to manage the data in the Cable Manufacturers supporting table, which contains all the items of the Manufacturer select list on the Cable Properties dialog box.

Supporting Table	Description
Cable Models	Allows you to manage the data in the Cable Models supporting table, which contains all the items of the Model select list on the Cable Properties dialog box. SmartPlant Instrumentation classifies cable models according to manufacturer.
Cable Colors	Allows you to manage the contents of the Color select list on the Cable Properties dialog box.
Cable Glands	Enables you to manage the data in the Cable Glands supporting table, which contains all the items of the End 1 and End 2 select lists in the Glands group box of the Cable Properties dialog box. This way, you can assign cable glands to selected cable types. Once assigned to a cable type, the gland attributes automatically propagate to all the cables of that type.
Cable Harnesses	Allows you to define and maintain the contents of the Cable harness select list on the Cable Properties dialog box.
Conductor Cross- Sections	Enables you to manage the conductor cross-section data for the cables in the current <plant>. The values that appear in this dialog box are available in the Cross-section select list on the Cable Properties dialog box.
Wire Types	Allows you to manage the contents of the Type list on the Wire Properties dialog box.
Wire Colors	Allows you to manage the contents of the Color list on the Wire Properties dialog box.
Connector Types	A connector type defines pin configuration and other properties. When you define connectors for a cable, selecting a connector type copies these properties for the cable connector. This supporting table allows you to create and manage the connector types required for your plug-and- socket boxes and for cables that require connectors.
Connector Manufacturers	Allows you to manage the contents of the Manufacturer select list on the Connector Types dialog box.
Connector Models	Allows you to manage the contents of the Model select list on the Connector Types dialog box. Connector models are classified according to the Manufacturer column. The information used in the other columns can be found in the manufacturer's catalog.
Controllers	The controller is the processing hardware that controls and supervises I/O cards. This supporting table allows you to define and manage your I/O card controllers. You can define new controllers, edit the properties of existing controllers, and delete controllers.
Channel Types	Allows you to manage the contents of the Channel Type select list on the Channels dialog box.
Segment-Wide Parameter Profiles	Allows you to define default settings that serve as design rules for the various Fieldbus segments.

Supporting Table	Description
Standard Widths	Each routing trunk that you define consists of positions. Instead of defining new positions for each additional trunk, you select the positions from the list of standard positions. Instead of defining the width for each standard position that you can add to a trunk, you select it from the standard width list that you set in this supporting table. You use the widths that you add in this supporting table to define the positions in a routing trunk. The width that you define here is a standard unit and therefore can be used several times to characterize different positions.
Standard Routing Positions	Each routing section of type trunk that you define consists of positions. (Building sections do not have positions.) Instead of defining new positions for each additional trunk, you select the positions from the list of standard positions that you define in this supporting table.
Maximum Number of Cables	The maximum number of cables limits the number of cables that a position can contain. After you have defined widths and created positions, you need to set the maximum number of cables per defined-width position that you want to associate with a routing trunk.
Routing Sections	Defining routing sections is the last step in creating the <plant> cable routing before associating routing with cables. The cable routing sections contain the positions that convey the cables between the instruments. Using this supporting table, you can add or edit a routing section and select positions to be included in a trunk section. The positions that you can select are those for which you have already defined the maximum number of cables.
Cable Drums	Allows you to define and manage the cable drums in your <plant>. Note that cable drums are categorized according to cable type.
Pulling Areas	Allows you to define the pulling areas in your <plant>. The pulling area in the <plant> is the area allocated to cables and the cable drums they are wound on. The purpose of allocating pulling areas is both to organize the <plant> drums in designated areas and to regularly use the cables from these areas.
DCS Block Types	Allows you to manage the block type data for control system tags. The values that appear on this dialog box are available in the Block Type select list on the Control System Tag Properties dialog box.
DCS Function Block I/O Termination	Enables you to manage the DCS function block I/O termination data for control system tags. The values that appear on this dialog box are available in the Function block I/O termination select list on the Control System Tag Properties dialog box.

NOTES

- For the explanation of instrument types and their functionalities, see Working with Instrument Types.
- For the supporting tables used in Telecom, see *Supporting Tables for Telecom* (on page 41).

Supporting Tables for Telecom

The following table lists all the available Telecom supporting tables and the description of their functions. You can access these supporting tables by clicking  next to a list arrow or by clicking **Tables > Telecom** and then an appropriate command in the Instrument Index and Wiring modules.

Supporting Table	Description
Telecom Device Types	Allows you to create and manage telecom device types. You define the required telecom device type profile for your telecom tag numbers so that new tags that you create can acquire the necessary properties. SmartPlant Instrumentation provides a number of predefined telecom device types, such as AL (alarm), CAM (camera), and so forth. You can add new telecom device types and modify the shipped ones as desired. You can also delete a telecom device type that is not in use, but the software does not let you delete a telecom device type that you already used to create a tag number.
Telecom Line Numbers	Allows you to maintain the contents of the Telecom line list when creating a telecom field device in the Plug-and-Socket Box wizard and the Line number list on the Tag Number Properties dialog box.
Telecom Field Equipment	Allows you to maintain the contents of the Field equipment select list on the Tag Number Properties dialog box.
Telecom Signal Levels	Allows you to maintain the contents of the Signal level select list on the Tag Number Properties dialog box.
Panel Sub-Systems	Allows you to maintain the contents of the Sub-system select list on the Equipment Panel Properties dialog box.
Telephone Numbers	Allows you to define new telephone numbers that you can associate with existing switch channels in PABX cabinets.
Telephone Number Statuses	Allows you to manage the contents of the Telephone number status select list on the Telephone Number Properties dialog box.
Telephone Number Usages	Allows you to manage the contents of the Telephone number usages select list on the Telephone Number Properties dialog box.
Intercom Numbers	Allows you to define new intercom numbers that you can later associate with amplifiers.
PA Zones	Allows you to manage the PA zone definitions which are available for selection on the Category Properties tab of the Wiring Equipment Properties (Amplifier) dialog box.
Alarm Zones	Allows you to manage the alarm zone definitions which are available for selection on the Category Properties tab of the Wiring Equipment Properties (Amplifier) dialog box.
PABX Categories	Allows you to manage the contents of the PABX categories select list on the PABX Cabinet Properties dialog box.

NOTE For the various actions that you can perform with supporting tables, see *Supporting Tables* (on page 34).

Add a New Value to a Select List

This option shows you how to add a new value to a select list. All values are stored in the supporting tables that you can access from various windows and dialog boxes. You can access a supporting table from a menu by selecting the appropriate item from the **Tables** menu or by clicking  in a dialog box.

1. Open the appropriate supporting table by clicking  in the appropriate dialog box or by selecting the appropriate menu item on the **Tables** menu.
2. In the appropriate supporting table dialog box, click **New**.
3. Type the required value in the fields provided, and press **Tab** to move to the next field.
4. Click **New** to enter another new value, if desired.
5. Click **OK** to accept the new values and close the dialog box.

Manage a Custom Table

This option shows you how to use custom tables, as defined by the Domain Administrator, to contain supporting data for instruments. After you enter your data in a **Custom Table** dialog box, you can use this data as additional tag attributes when setting a profile in the **Instrument Type Profile** dialog box, and when editing tag number properties in the **Tag Number Properties** dialog box.

1. In the Instrument Index Module menu, click **Tables > Custom Tables**, and then select the custom table you want to open.
2. To add a new record, click **New**, and then type a unique name and an optional description.
3. To edit an existing record, click a value that you want to edit, and modify as needed.
4. To delete a record, select the row that you want to delete, and click **Delete**.
5. Click **OK**.

NOTE The Domain Administrator has rights to create the required custom tables for each <plant>. If the Domain Administrator does not create any custom tables, the **Custom Tables** menu option is not available.

Customize Manufacturer-Specific Field Headers

This feature allows you to customize field headers, to fit panel manufacturer terminology, on panel dialog boxes, such as DCS, PLC, I/O Cards and so forth. The customized field headers and labels replace the default headers and labels according to the selected manufacturer when editing panel properties. The default headers are the same as the Data Dictionary display names. After customizing panel manufacturer-specific headers, the custom headers appear not only on the relevant panel properties dialog box but also on all child items dialog boxes and appropriate reports.

1. Do one of the following to open the **Panel Manufacturers** dialog box:
 - In the Wiring module, click **Tables > Panel > Manufacturers**.
 - Click  next to the **Manufacturer** select list on the appropriate panel dialog box.
2. On the **Panel Manufacturers** dialog box, click **Headers**.

3. From the **Wiring item** list, select the item type for which you want to customize the field headers.
4. Under **Custom item name**, type a custom item name for the selected item type.
5. Under **Custom Field Header**, type the text you require next to the appropriate value that appears under **Field Header in Data Dictionary**.
6. Repeat steps 3 to 5 as many times as you require.
7. Click **OK**.

Revision Management

When managing revisions, you can add revisions to documents in SmartPlant Instrumentation, update them as needed, archive and compare new and existing document revisions, and delete obsolete revisions. A document is a report or drawing that has a document number. Also, you can add a document number when adding a revision to an item .

The software allows you to add a revision to a specific report, drawing, or item , for example, to a specific I/O card in the Wiring module. You add revisions to reports in the report print preview and to items in the dialog boxes where you can edit the item properties. Also, you can create global revisions.

In the Administration module, in the **Report Management** dialog box, the Domain Administrator has rights to define revision management settings individually for each report that you can generate in SmartPlant Instrumentation.

In the database, each report is assigned to the report type, which can be a list or a non-list type report. The report type determines how you can manage revisions created for a specific report, for an item , or a group of items. For list-type reports, the Domain Administrator can enable SmartPlant Instrumentation users to manage revisions either per document or per item .

In accordance with the revision management setting, you can either create a revision whose document number and revision number become shared for a specific item and for reports generated for that item (when the setting is per-item), or create a unique revision for a particular report (when the setting is per-document).

Regardless of the revision management setting, any document numbers and revisions that you create in the software are shared with the document numbers and revisions created for the same items in the Enhanced Report Utility. For example, a drawing created in the Enhanced Report Utility automatically inherits the same document number and revision that you assigned to an Enhanced SmartLoop report generated in SmartPlant Instrumentation.

When working in an integrated environment, you can specify whether to use SmartPlant Instrumentation revisions or external revisions created when working in an integrated environment. For more information about using revisions in an integrated environment, see *Revising Documents in an Integrated Environment* (on page 487).

To place issue data on title blocks for enhanced reports, use the **Place Drawing Property Label** command in the Enhanced Report Utility. For more information, see *Place Property Labels on a Drawing Sheet* in the *Enhanced Report Utility User's Guide*, under *Working with Templates and Title Blocks*.

NOTE When generating more than one revision report, toggle between them by selecting the report to be viewed from the **Window** menu in SmartPlant Instrumentation.

Global Revisions

Global revisions enable you to perform a revision activity in batch mode.

At the first stage of applying global revisions, you select a revision activity, and define the default revision settings, such as revision values, numbering method, and revision details. At the second stage, you select the required items in a specific module, and apply the defined revision settings.

Revision activities include:

- **Add revision** — select the required numbering method and add a new revision.
- **Update revision** — change the existing revision value without changing the numbering method. For example, you can update a revision from **A1** to **A2**.
- **Upgrade revision** — involves changing the revision numbering method. For example, you can upgrade a revision from **P0** to **A**.
- **Delete revisions** — delete all revisions for the selected items.
- **Delete last revision** — delete only the last revision.

You can add global revisions to non-list-type reports for which the Domain Administrator selected the Per Document revision management setting in the **Report Management** dialog box.

An exception is Enhanced Report Utility reports, which are always assigned to the **Per Item revision management** setting. The document number and global revision that you create in SmartPlant Instrumentation are shared with the document number and revision created in the Enhanced Report Utility.

NOTE Items that have archive options defined as **Save to database**; any revisions are only saved to the archive after closing the **Global Revisions** dialog box. Adding a revision and then deleting the revision, before closing the dialog box, results in the revision not being archived.

Filter Items for Global Revisions

You can filter the items in the data window of the **Global Revisions** dialog box when adding, updating, upgrading, or deleting revisions in batch mode. On the **Wiring** tab of the **Global Revisions** dialog box, you can also filter the Wiring module items per report.

1. In the **Global Revisions** dialog box, click one of the following tabs: **Specifications**, **Process Data**, **Calculations**, **Loops**, **Hook-Ups**, **Wiring**, or **Dimensional Data**.

TIPS

- If you accessed the **Global Revisions** dialog box from the main **SmartPlant Instrumentation** window, tabs for multiple modules are available; if you accessed the dialog box from a particular module, then only the **Settings** tab and the tab for that module are available.
 - If you are working in an integrated environment, then regardless of where you access this dialog box from, the following tabs are disabled: **Specifications**, **Process Data**, **Loops**, and **Dimensional Data**.
2. If you selected the **Wiring** tab, do the following:
 - Under **Filter parameters**, from the **Report for** list, select the item for which you want to apply revisions: **Panels**, **Cables**, or **DCS/PLC**.
 - From the **Report type** list, select a report type appropriate for the item you selected in the previous step.

TIP

To set new filter parameters, first click **Clear**.

3. For all tabs, under **Filter parameters**, type values in one or more of the text boxes to specify the parameters that you want to use for filtering the data.

4. Select the **Display current <unit> data only** check box to display the data in the current <unit>. Clear this check box to display all data at the level of the current <plant>.
TIP On the **Hook-Ups** tab, data is filtered at the <plant> level only.
5. Select **Activate filter** to apply the filter parameters on the items.
TIP If you select the **Activate filter** check box first, the software filters the data as you select or type the filter parameters.
6. Select **Enable wildcard search** to use a wildcard, if required, in your search.
TIPS
 - The **Enable wildcard search** is enabled only when **Activate filter** has been selected.
 - The % character is used as the wildcard symbol in your filter.
7. Click **Refresh** to update the data window as needed.
8. Click **Apply**.

Add Global Revisions

This option enables you to add a global revision to items that belong to any of the following modules: Specifications, Process Data, Calculation, Loop Drawings, Hook-Ups, Wiring, and Dimensional Data.

1. In the main window of any SmartPlant Instrumentation module, click **Tools > Global Revisions**.
2. On the **Settings** tab of the **Global Revisions** dialog box, from the **Activity** list, select **Add revision**.
3. In the **Revision** field, enter the desired revision value.
4. Do the following to enter the revision details:
 - In the **Revised by** field, enter the initials of the person performing the revision. The default is the current user's initials, if previously defined by the System Administrator.
 - In the **Date** field, enter the date of revision, if required.
 - Fill out the other fields as needed.
5. Click one of the following tabs: **Specifications**, **Process Data**, **Calculations**, **Loops**, **Hook-Ups**, **Wiring**, or **Dimensional Data**.
TIPS
 - If you accessed the **Global Revisions** dialog box from the main **SmartPlant Instrumentation** window, tabs for multiple modules are available; if you accessed the dialog box from a particular module, then only the **Settings** tab and the tab for that module are available.
 - If you are working in an integrated environment, then regardless of where you access this dialog box from, the following tabs are disabled: **Specifications**, **Process Data**, **Loops**, and **Dimensional Data**.
6. In the data window, filter the items as needed. For details, see *Filter Items for Global Revisions* (on page 44).
7. In the data window, select the items for which you want to add a global revision defined on the **Settings** tab by doing one of the following:
 - Select the desired tag numbers (hold down **Ctrl** or **Shift** to make multiple selections).
 - Select the **Select all** check box to select all the tag numbers in the data window.
8. Click **Apply** to add a revision to each of the selected items.

If you want to add revisions for other modules, repeat the appropriate steps for each module.

NOTE Items that have archive options defined as **Save to database**; any revisions are only saved to the archive after closing the **Global Revisions** dialog box. Adding a revision and then deleting the revision, before closing the dialog box, results in the revision not being archived.

Define Settings for Upgrading Revisions

This option enables you to define default settings for upgrading revisions globally. These settings include revision numbering method, and revision details.

1. With any main window open, click **Tools > Global Revisions**.
2. On the **Settings** tab, from the **Activity** list, select **Upgrade revision**.
3. To change the numbering method for items that do not currently have revisions, from the **Initial revision numbering method** list, select one of the following numbering methods you want to start with:
 - **P0** — for preliminary number sequence P0, P1, P2,...
 - **0** — for number sequence 0, 1, 2,...
 - **A** — for number sequence A, B, C,...

TIP The initial revision numbering method only affects items that do not have revisions. For items that already have revisions, the software adds a new revision line using the existing revision numbering method.

4. To change the numbering method for items that currently use the preliminary revision numbering method (P0, P1, P2,...), select **Switch to another numbering method**, and from the **Continue using numbering** list, select one of the following new revision numbering methods:
 - **0** — for number sequence 0, 1, 2,...
 - **A** — for number sequence A, B, C,...
5. Do the following to enter the revision details:
 - In the **Revised by** field, enter the initials of the person performing the revision. The default is the current user's initials, if previously defined by the System Administrator.
 - In the **Date** field, enter the date of revision, if required.
 - Fill out the other fields as needed.
6. Click the appropriate module tab to apply the defined settings. For details, see *Upgrade Revisions Globally* (on page 47).

TIPS

- If you accessed the **Global Revisions** dialog box from the main **SmartPlant Instrumentation** window, tabs for multiple modules are available; if you accessed the dialog box from a particular module, then only the **Settings** tab and the tab for that module are available.
- If you are working in an integrated environment, then regardless of where you access this dialog box from, the following tabs are disabled: **Specifications**, **Process Data**, **Loops**, and **Dimensional Data**.

See Also

Revision Upgrade Example (on page 48)

Update Revisions Globally

You can update the existing revision values globally for the items used in the following modules: Specifications, Process Data, Calculation, Loop Drawings, Hook-Ups, Wiring, and Dimensional Data.

1. With any main window open, click **Tools > Global Revisions**.
2. On the **Settings** tab, from the **Activity** list, select **Update revision**.
3. In the **Revision** field, enter the desired revision value.
4. Do the following to enter the revision details:
 - In the **Revised by** field, enter the initials of the person performing the revision. The default is the current user's initials, if previously defined by the System Administrator.
 - In the **Date** field, enter the date of revision, if required.
 - Fill out the other fields as needed.
5. Click one of the following tabs: **Specifications**, **Process Data**, **Calculations**, **Loops**, **Hook-Ups**, **Wiring**, or **Dimensional Data**.

TIPS

- If you accessed the **Global Revisions** dialog box from the main **SmartPlant Instrumentation** window, tabs for multiple modules are available; if you accessed the dialog box from a particular module, then only the **Settings** tab and the tab for that module are available.
 - If you are working in an integrated environment, then regardless of where you access this dialog box from, the following tabs are disabled: **Specifications**, **Process Data**, **Loops**, and **Dimensional Data**.
6. In the data window, filter the items as needed. For details, see *Filter Items for Global Revisions* (on page 44).
 7. In the data window, do one of the following to select the items whose revisions you want to update:
 - Select the desired tag numbers (hold down **Ctrl** or **Shift** to make multiple selections).
 - Select the **Select all** check box to select all the tag numbers in the data window.
 8. Click **Apply** to apply the new revision value to all the selected items in batch mode.
 9. If you want to update revisions for other modules, repeat the appropriate steps for each module.

Upgrade Revisions Globally

After defining the default settings for upgrading revisions, you use this option to apply these settings to the selected items in batch mode.

1. Define the settings for upgrading revisions globally. For details, see *Define Settings for Upgrading Revisions* (on page 46).
2. Select the desired module tab and filter the items as needed. For details, see *Filter Items for Global Revisions* (on page 44).
3. To change the numbering method for items that do not currently have revisions, from the **Initial revision numbering method** list, select one of the following numbering methods you want to start with:
 - **P0** — for preliminary number sequence P0, P1, P2,...
 - **0** — for number sequence 0, 1, 2,...

- **A** — for number sequence A, B, C,...
4. In the data window, do one of the following to select the items for which you want to upgrade revisions:
 - Select the desired tag numbers (hold down **Ctrl** or **Shift** to make multiple selections).
 - Select the **Select all** check box to select all the tag numbers in the data window.
 5. Click **Apply** to apply the new revision value to all the selected items in batch mode.
 6. If you want to upgrade revisions for other modules, repeat the appropriate steps for each module.

Revision Upgrade Example

This example is based on the following parameters:

- Initial numbering method: **P0**
- Switch to numbering method for preliminary revisions: **A**

With the above parameters, the following results are obtained for subsequent revisions (on clicking **Apply** in the module sub folders of the **Global Revisions** dialog box):

Previous	1	2	2	Comments
None	P0	A	B	First revision uses initial numbering method (P0); subsequent revisions use switch to numbering method (A, B, and so forth.)
P2	A	B	C	First and subsequent revisions use switch to numbering method (A, B, and so forth.)
A	B	C	D	Incremented by one step each time from the previous revision
B	C	D	E	Incremented by one step each time from the previous revision
1	2	3	4	Incremented by one step each time from the previous revision
2	3	4	5	Incremented by one step each time from the previous revision

Delete Global Revisions

You can perform batch deletion of revisions if you have the appropriate access rights. You have the option to delete all revisions for the selected items in the specified module, or delete only the last revisions.

1. In the main window of any SmartPlant Instrumentation module, click **Tools > Global Revisions**.
2. On the **Settings** tab of the **Global Revisions** dialog box, from the **Activity** list, select one of the following:
 - **Delete revisions** — select to delete **all** revisions for the selected items.
 - **Delete last revision** — select to delete the last saved revision for each selected item.

- Click one of the following tabs: **Specifications**, **Process Data**, **Calculations**, **Loops**, **Hook-Ups**, **Wiring**, or **Dimensional Data**.

TIPS

- If you accessed the **Global Revisions** dialog box from the main **SmartPlant Instrumentation** window, tabs for multiple modules are available; if you accessed the dialog box from a particular module, then only the **Settings** tab and the tab for that module are available.
 - If you are working in an integrated environment, then regardless of where you access this dialog box from, the following tabs are disabled: **Specifications**, **Process Data**, **Loops**, and **Dimensional Data**.
- In the data window, filter the items as needed. For details, see *Filter Items for Global Revisions* (on page 44).
 - In the data window, do one of the following to select the required items:
 - Select the desired tag numbers (hold down **Ctrl** or **Shift** to make multiple selections).
 - Select the **Select all** check box to select all the tag numbers in the data window.
 - Click **Apply** to delete the revisions for the selected items.
 - If you want to delete revisions for other modules, repeat the appropriate steps for each module.

Add Local Revisions

You can add revisions locally to a specific SmartPlant Instrumentation document or item, depending on revision management settings defined by the Domain Administrator. For all list-type reports, the revision management setting is always Per Document. For certain non-list-type reports, the Domain Administrator has rights to define the setting as either Per document or Per Item.

- In the **Revisions** dialog box, select one of the revision numbering methods from the **Revision method** list (use P0, P1, P2... for preliminary revisions or 0, 1, 2 / A, B, C, and so forth for normal serial revisions).

TIP

If you select a revision numbering method other than preliminary revisions (P0, P1, P2...), you will not be able to return to the preliminary revision method and this option will be disabled.

- If needed, in the **Drawing number** field, type the number of the document associated with the item for which you create the revision. In drawings and reports, this number appears in the title block.
- Click **New** to add a new revision.

TIPS

- If you are working in an integrated environment in a module that supports publishing and retrieving of documents, clicking **New** opens the **Revise** dialog box for the integrated environment instead of the SmartPlant Instrumentation **Revisions** dialog box.
 - The software automatically increments the revision number according to the selected revision method. You can overwrite SmartPlant Instrumentation revisions if desired.
- Add or edit the revision data as needed.

NOTE

If the document for which you are making a revision contains a custom-title block, the **User-defined fields** data window becomes available for you. In this data window, you can view the user-defined fields that you added to the custom title block that you created. To learn more about custom title blocks, see *Customizing Title Blocks for Reports* (on page 635).

Edit Local Revisions

Use this procedure to edit existing local revisions.

1. In the **Revisions** dialog box, select the revision that you want to edit.
2. Make the desired changes according to the revision table:

Field	Description
No	The revision number. This is incremented automatically according to the revision method selected, you can overwrite it if required.
By	Type the initials of the person performing the revision. The default is the current logged-in user initials, if previously defined by the System Administrator.
Date	The default is today's date, you can modify it if required.
Description	Description of the changes made or the purpose of the revision.
Checked By	Type the name of the person checking the revision, if required.
Approved By	Type the name of the person approving the revision, if required.

3. Make changes for other revisions as desired.
4. Click **OK** to apply your changes.

Delete Local Revisions

Use this procedure to delete existing local revisions.

1. On the **Revisions** dialog box, select the revision that you want to delete.
2. Click **Delete**.

View an Archived Revision

1. In the Administration module, select the desired archiving option. For details, see *Set Archiving Options for Report Comparison* in the *Administration User's Guide*, under *Domain and Project Administration, Report Management*.
2. In SmartPlant Instrumentation application, save a revision for the desired document.

IMPORTANT

 - For enhanced reports, you must perform revisions from the Enhanced Report Utility if you want them to be archived for performing report comparison or viewing a changes report.
 - The software archives revisions for browser view reports separately for each view regardless of any existing filter or sort sequence.
3. On the **Print Preview** toolbar, click  to open the **Document Revision Archive** dialog box where you view the revision.
4. Double-click the desired revision or revisions to open the print preview.

Report Comparison

Report comparison is available if you have saved revisions for a particular report. For every saved report revision, there is an archived report, stored according to the archiving option. The Domain Administrator defines an archiving option for each report.

When comparing reports, you can generate a comparison report to view the report fields in which the values are different.

NOTES

- Report comparison is only available if the System Administrator has selected **Audit trail options** in the **Domain Definition** window for the current domain, and if the Domain Administrator has selected one of the options for saving revisions of the specified report in the **Report Management** dialog box in the Administration module.
- Report comparison of an entity in a claimed project with the same entity in As-Built is only available if the Domain Administrator has selected one of the options for **Archiving option** under **Activities, Report Management** in the Administration module for both As-Built and the project for the desired report.
- For enhanced reports, you must perform revisions from the Enhanced Report Utility if you want them to be archived for performing report comparison.
- You cannot perform report comparison for PowerSoft browsers.

Using report comparison, you can do the following:

- Compare the currently previewed report with an archived report. For details, see *Comparing the Current Report with an Archived Report* (see "Compare the Current Report with an Archived Report" on page 53).
- Compare two archived reports. For details, see *Comparing Archived Reports* (see "Compare Archived Reports" on page 52).

Set Font and Color for Report Comparison

This option enables you to set a comparison color and font style prior to comparing reports. The preset color and font style appear in a previewed report after comparing this report with an existing archived report. You can also set the grayscale and font style to appear in a printed report after report comparison. In a previewed report, the comparison color and font style indicate the differences between the previewed report and an archived report selected for comparison.

1. On the **Tools** menu of any SmartPlant Instrumentation module, click **Data Comparison Display Options**.
2. Beside the **Highlight color for display** field, click .
3. In the **Color** dialog box, choose the color that you require.
4. Click **OK** to return to the **Data Comparison Display Options** dialog box.

TIP The highlight color you have set appears after report comparison in any report print preview to indicate the differences between the current and the archived report.

5. Beside the **Grayscale** field, click .
6. In the **Grayscale** dialog box, move the slider to the required position.
7. Click **OK** to close the **Grayscale** dialog box.

TIP The grayscale you have set appears after report comparison in a printed report to indicate the differences between the current and the archived report.

8. Under **Font style**, do the following if required:
9. Select **Bold** to mark the differences between the current and the archived report in bold.
10. Select **Italic** to mark the differences between the current and the archived report in italic.

Compare Archived Reports

This option enables you to compare between two archived reports.

1. Open the report that you want to compare reports.
2. In the **Print Preview** window, do one of the following:
 - On the **Print Preview** window toolbar, click .
 - On the **View** menu, click **Compare Reports**.
3. In the **Report Comparison Options** dialog box, click **Compare two archived reports**.
4. Click **OK**.
5. In the **Select Archived Revisions for Report Comparison** dialog box, do the following:
 - a. From the **Compare** data window, select the revision corresponding to the source archived report.
 - b. From the **With** data window, select the revision corresponding to the target archived report that you want to compare with the source report.

TIP If there is a long list of revisions in either of the data windows, type the desired revision number in the **Revision filter** box and select **Activate**.

NOTE If the archived and the currently previewed reports are different, in the previewed report the software marks the differences in color. If required, you can set your own comparison highlight color and font style to indicate the differences for report display. You can also set a grayscale and font style to indicate the differences in a printed report.

Compare the Current Report with an Archived Report

The option enables you to compare the currently previewed report with an archived report.

1. In the **Print Preview** window, do one of the following:
 - On the **Print Preview** window toolbar, click .
 - On the **View** menu, click **Compare**.
2. In the **Report Comparison Options** dialog box, click **Compare the current report with an archived report**.
3. Click **OK**.
4. In the **Report Revision Archive** dialog box, select the revision corresponding to the archived report that you require.

TIP If there is a long list of revisions in the data window, type the required revision number in the **Revision filter** box and select **Activate**.
5. Click **OK** to reopen the **Print Preview** window.

TIP If the archived and the currently previewed reports are different, in the previewed report the software marks the differences in color. If required, you can set your own comparison highlight color and font style to indicate the differences for report display. You can also set a grayscale and font style to indicate the differences in a printed report.

View Archived Reports

This option enables you to open a report preview of any archived report. The software automatically archives reports when saving report revisions for the currently previewed report. The Domain Administrator defines an archiving option for each report.

1. In the **Print Preview** window, do one of the following:
 - On the **Print Preview** window toolbar, click .
 - On the **View** menu, click **Report Revision Archive**.
2. In the **Report Revision Archive** dialog box, select the revision which corresponds to the archived report you want to view.

TIP If there is a long list of revisions in the data window, type the required revision number in the **Revision filter** list, and select **Apply**.
3. Click **OK** to open the archived report in the **Print Preview** window.

Display a List of Changed Documents

This option enables you to display a list of documents for which data modifications have been made. To use this option, the Domain Administrator must first select the **Save Document Data** option in the **Report Management** dialog box for each report that you want to include in the list. The software does not include in changes reports any modifications that you make to title block macros or external symbols such as DCS data or non-wiring tag lists in enhanced reports.

The software does not display data changes in the following cases:

- If you add a new item such as a panel or gland in list reports, because the software cannot determine whether the item is part of the document.
 - If you remove or assign tags or items in the Hook-ups module
 - For the Instrument Index Drawing Summary Browser. Changes that you make in the Instrument Index Standard Browser are included in the **Browse – Instrument Index Report** item, and not in the **Instrument Index** under the list of browser
1. On the **Tools** menu, click **Changed Documents**.
 2. In the **Changed Documents** dialog box, do one of the following:
 - Under **Document types**, highlight the desired document types. For multiple selection, hold down Ctrl or Shift while making your selection.
 - Select the **Select All** check box.
 3. Under **Filter by**, select an option to specify the method of filtering. The available options are:
 - **Documents changed since last revision** — select to filter documents for which data was changed since the last revision of the document. If there is no revision, the software does not display that document.
 - **Documents changed between specified dates** — select to filter documents for which data was changed during the date range specified by the **From date** and **To date** fields.
 4. Click **Find** to retrieve the list of changed documents according to the document types and filter options that you specified.
 5. Click **Changes Report** if you want to display a report of the changed documents.

Workflow

The Workflow option enables instrument engineers to control the data entry process for instrument tags by specifying if and when process data should be entered for a particular tag. Workflow defines an additional level of access rights for individual instrument tags, determined by the Workflow status of the tags. In this way, an instrument engineer, while working on instrument data for a particular tag, can lock out process engineers from making changes to process data until all the instrument data has been entered.

Example Scenario

The following stages describe a typical Workflow scenario:

1. An instrument engineer creates a new instrument tag and determines whether or not the tag requires process data. In the event that the instrument tag does require process data, the process data fields of the tag become available to the process engineers for editing.
2. The process engineer, after first accessing the instrument tag for editing of process data, can lock the process data fields against any changes wherever the instrument engineers have access rights.

3. On being released by the process engineer, the instrument engineer can now enter instrument data as required. The instrument engineer can lock the tag against any changes wherever the process engineers have access rights.

Workflow Prerequisites

Before you can implement Workflow in a given <unit>, the System Administrator and Domain Administrator need to perform the following tasks:

- The System Administrator enables Workflow in your domain. For more information, see *the Administration module Online Help, System Administration > Domain Management > Enable Workflow*.
- The Domain Administrator defines two groups that will be responsible for working in the areas of process engineering and instrument engineering. For more information, see *Creating a New Group Profile in Online Help for the Administration module*.
- The Domain Administrator does one of the following:
 - Associates Windows groups with the SmartPlant Instrumentation process engineering and instrument engineering groups. For more information, see *the Administration module Online Help, Users, Departments, and Groups > Create a Group for Windows Authentication Logon Method*.
 - Assigns users individually to the process engineering and instrument engineering groups. For more information, see *the Administration module Online Help, Users, Departments, and Groups > Assign Users to Groups*.
- The Domain Administrator defines Workflow access rights for the process engineering and instrument engineering groups. For more information, see *the Administration module Online Help, Domain And Project Administration > Access Rights > Workflow Access Rights*.

NOTE After initialization of a domain from a source or after a version upgrade, it is essential to regenerate the library forms to enable the Workflow options to be used in the Specifications Browser. For details, see *Regenerate Library Forms* (on page 229).

Create a Workflow Browser

IMPORTANT

- Workflow needs to be set up by an instrument engineer.
 - Make sure that the System Administrator and the Domain Administrator have prepared SmartPlant Instrumentation for Workflow.
1. Open the **Browser Manager**.
 2. Under **Browser groups**, double-click **Workflow** to expand the hierarchy.
 3. Select the **Instrumentation/Process Data Browser** and create a new view.
 4. Double-click the view to expand the hierarchy.
 5. Click , and in the **Style** settings section, click **Edit**.
 6. Select the check boxes in the **View** column to specify the fields to be displayed in the view.

IMPORTANT You must include the **Process Data Status** field among the fields selected for displaying in the view.
 7. Click **Save**.
 8. Select the View level in the tree, and then click **Actions > Open View**.

NOTE The **Browser View** opens showing the process data statuses for all the instrument tags in the database. For details, see *Process Data Statuses* (on page 57).

Implementing Workflow

Workflow implementation begins when the instrument engineer who is going to work on particular instrument tags determines whether those tags require process data. Next, those tags that do require process data are assigned to a process engineer for process data input. On completion of the data input, the tags are reassigned to the instrument engineer for instrument data input.

Enter Initial Instrument Data

1. Log on to SmartPlant Instrumentation as a user in the **Instrument** group.
 2. In the Instrument Index module, create the instrument tags as you require and enter appropriate data.
 3. In the **Browser Manager**, under **Browser groups**, double-click **Workflow** to expand the hierarchy.
 4. Refresh the screen by clicking .
- TIP** Any new instrument tags should be visible, with default status: **Process Data not Required**.
5. In the **Process Data Status** field, select the required status of each instrument tag you will be editing as follows:
 - a. For instrument tags that require process data, select status: **Process Data Required**. These tags will be available for the process engineer in the Process Data and Calculation modules.
 - b. For instrument tags that do not require process data, select status: **Process Data not Required**.

Enter Process Data for Instrument Tags

1. Log on to SmartPlant Instrumentation as a user in the **Process** group.
2. In the Process Data module, for each tag that requires the addition of process data, do the following:
 - a. Find and open the tag.
 - b. In the **Process Data** window, enter process data as you require.
 - c. On the **Actions** menu, click **Save Process Data**.
3. In the **Select a New Process Data Status** dialog box, select **Release to Instrument**, and click **OK**.

Enter Additional Instrument Data

1. Log on to SmartPlant Instrumentation as a user in the **Instrument** group.
2. In the **Browser Groups** list, **Workflow**, select the **Instrumentation/Process Data Browser** and open the view you created for it.
3. For each tag for which you want to edit instrument data, make sure that the value under **Process Data Status** is **Lock out from Process**.
4. In the Instrument Index module, do one of the following:
 - Open each tag individually and enter the required instrument data.
 - Create an appropriate Instrument Index browser view from which to enter the data.

Process Data Statuses

There are five statuses that relate to tags under Workflow. The following table provides a description of each status and which groups (instrument engineers or process engineers) are allowed to set and change the status in the Workflow > Instrumentation / Process Data Browser and in the Process Data module:

Status	Description	Set / Changed by
Process Data not Required	Tags that do not require process data and therefore are not available to the process engineering group.	Set and changed by instrument engineers.
Process Data Required	Tags available for process data entry by the process engineering group (in the Process Data module or Browser).	Set by instrument engineers. Can be changed by process engineers.
Lock out from Instrument	Tags marked for editing by the process engineering group and not available to the instrument group.	Set and changed by process engineers.
Release to Instrument	Tags available to the instrument engineering group following release from the process group.	Set by process engineers. Can be changed by instrument engineers.
Lock out from Process	Tags not available to the process engineering group.	Set and changed by instrument engineers

Printing and Saving Documents

You can print or save documents containing essential data from every module. Documents that can be printed include all reports, and some visual presentations of data such as point- to-point wiring diagrams. Selecting to preview a document ensures that it will be printed the way you want and enables you to specify the file format if you want to save the document.

NOTE The page size of specification and wiring reports is hard-coded to A4, therefore only this setting will apply when printing these reports.

Preview Documents

The option to preview a document is available whenever you select a report, a point-to point wiring diagram for printing, or if you select the **Print Preview** option from a browser view.

NOTE The **Print Preview** dialog box appears only after you select **Always** or **Ask user** in the **General** tab of the **Preferences** dialog box.

1. Select the report you want to display and when prompted to preview the report, click **Yes**.
2. Click  to adjust the currently displayed report's magnification level.
3. In the **Zoom** dialog box, do one of the following:
 - In the **Magnification** section, select a predefined magnification level: 200%, 100% (the default level), 65%, or 30%.
 - Type the required magnification level in the field next to the **Custom** option button.
4. Click **OK** to return to the **Print Preview** window at the selected magnification.
5. In the case of reports consisting of several pages or multiple reports, navigate using the following options:

Icon	View Menu Command	Description
	First Page	Browses to the first page of a multi-page report. You can also move through the pages of a report using the vertical scroll box. Clicking the scroll box displays the current page number.
	Previous Page	Browses to the previous page of a multi-page report
	Next Page	Browses to the following page of a multi-page report
	Last Page	Browses to the last page of a multi-page report
	First Report	Browses to the first report (available with multiple report selection only).
	Previous Report	Browses to the previous report (available with multiple report selection only).
	Next Report	Browses to the following report (available with multiple report selection only).
	Last Report	Browses to the last report (available with multiple report selection only).

Print Documents

Depending on the options you selected, printing is available directly when you select a document for printing, or you can print a document from a print preview. This procedure refers to general printing.

NOTE The Enhanced Report Utility prints PDFs using SmartPlant PDF Converter 401 and publishes them to the output folder specified in **File > Preferences > Enhanced Reports > <Report Type> >Viewer Output Folder** field for the specific report type. If no path is present then SmartPlant PDF Converter 401 publishes the PDF to the **Temp** folder as specified in **File > Preferences > General**.

1. Select the desired items from which you can print reports, and on the appropriate main menu or, if available, on a shortcut menu, click the report that you want to print.
2. If a print preview prompt appears, do one of the following:
 - Click **Yes** to display a print preview of one or more reports.
 - Click **No** to print the reports directly to a printer or a file.
3. To print a report from a print preview to a printer or a file, do one of the following:
 - In the **Print Preview** window, click  to print the currently selected report.
 - In the **Print Preview** window, click  to print all the retrieved reports or documents in batch mode.

NOTES

- If you choose to directly print a report without previewing it, and the particular report usually includes printing parameters when viewed in the **Print Preview** window (for example, selection of a group separator), a dialog box opens to enable you to select those same parameters prior to printing.
- The page size of specification and wiring reports is hard-coded to A4, therefore only this setting will apply when printing these reports.

Batch Printing Documents to PDF Files

SmartPlant Instrumentation supports batch printing of the following documents to .pdf files:

- Enhanced reports
- Specification sheets
- Binder packages from the Document Binder module (for details, see *Print from a Binder Package to a PDF File* (on page 337))

NOTES

- SmartPlant PDF Converter 401 publishes Enhanced Report PDFs to the output folder specified in **File > Preferences > Enhanced Reports > <Report Type>> Viewer Output Folder** field for the specific report type. If no path is present then SmartPlant PDF Converter 401 publishes the PDF to the **Temp** folder as specified in **File > Preferences >General**.
- For Specification Sheets, set the path in the **Print Specs to PDF Files** dialog box.
- For Document Binder packages, set the path in the **Print to file** dialog box.

Modify Printer Settings

This option enables you to view and modify the current printer settings, if required. You can select a standard paper size with predefined width, height, and orientation or customize these settings as required. Furthermore, you can save your settings as default for future print sessions. You can customize your own paper width, height, and orientation and include these values in the default settings. Note, that some reports, specifications and wiring in particular, have their orientation/page size hard-coded, therefore only the hard-coded settings will apply.

NOTES

- All your page settings apply to all reports and documents that you print and they are true for all plant hierarchy levels (domain, <plant>, <area>, and <unit>).
- All your page settings apply to your local machine only and do not affect other users of SmartPlant Instrumentation.
- If you want to change the page setup for the current print session only, do not click **Default**, just make your changes and click **OK**.

When saving your settings as default, the software stores the values in the Intools.ini file under the [PRINTER] section. If you want the software to calculate the required paper size from the Windows printer driver settings, open the Intools.ini file and under the [PRINTER] section, remove the semi-colon before the following parameters:

- LEFTMARGIN
- RIGHTMARGIN
- TOPMARGIN
- WIDTH
- HEIGHT
- ORIENTATION
- HRES
- VRES

Add a semi-colon before the PAPERSIZE parameter.

For additional information about this option, click **Help** in the **Page Setup** dialog box.

Save Documents

When you display a document, you can choose to save it as a file. This section describes the various methods available for saving documents.

1. With the **Print Preview** window open, click .
2. In the **Save As** dialog box, select one of the following data formats:
 - **Original**: Saves the report data in all the fields, including the ones that are not visible in the preview (for example, internal database ID numbers). This option is recommended if you want to save the file in .psr or .xls format, or if you want to re-import the data into SmartPlant Instrumentation at a later stage.
 - **Data Only**: Saves only the report data that is visible in the preview. This option is recommended for easier viewing of the data, and also enables you to manipulate the headers and select the columns you want to display.
3. Click **OK** and navigate to the location where you want to save the file.
4. Select the required file format and type the name of the file, then click **Save**.

Save in DXF Format

1. If you use SmartSketch or AutoCAD, you can save any report in the .dxf format for insertion into a CAD drawing. This option is available when you select to save a document as a file from a **Print Preview** window. On selecting to save the file in a .dxf format, you can specify the report insertion parameters in the target CAD drawing, define certain display properties, and set the software to include the title block and frame, if needed.

If a report has several pages, the software creates several .dxf files. A .dxf file can only contain a single page of a report.

IMPORTANT

- When saving a multi-page specification in .dxf format, the software only saves the active page of the spec print preview. To save all pages of a spec in .dxf format, you must display a print preview of each page and save the pages one by one.
- It is not possible to save the multi-tag (SEE LIST) page of a multi-tag spec in .dxf format.

Save a Document in DXF Format

1. With the **Print Preview** window open, click .
2. In the **Save As** dialog box, select **DXF File**.
3. In the **Save AsDXF Options** dialog box, select **Include title block and frame with report** to save the report with the title block (which includes the logo and generic report data) and the frame.

TIPS

- Clear the check box to exclude the title block and frame from the saved report if the CAD package has its own frame.
 - If you are working in batch mode to save a number of files that are to be opened in SmartSketch or AutoCAD, you can automate the process as far as possible.
4. Define the report placement parameters and other options as follows:

File	Description
Insertion point	The X and Y coordinates for the insertion point of the report in the CAD file define the displacement from the lower-left corner of the CAD file. The upper-left corner of the report is inserted at this location. This means that if the insertion point is defined as X=0 and Y=0, the report appears outside the CAD drawing frame, under the lower frame line.
Scale factor	The scale factor determines the size of the report so that it will fit into the CAD drawing.
Font height coefficient / Font width coefficient	Font height and width coefficients for the text characters in the report. This option is needed because the software calculates the font size independently of the size of the report, whereas a CAD application scales the font with the report as a whole.
Change black report color to	Type the value of the color to be used as a substitute for black. All reports are displayed in black-and-white. If viewing the report in a CAD application with a black background, an alternative foreground color needs to be used. The recommended value is 7.

5. Browse to the target folder and click **OK**.

Edit Document Headers

When you select to save a document as a file from the **Print Preview** dialog box and you choose to save it as data only, you have the option of saving the data with or without headers. Furthermore, if you select to include the headers with the data, you can also edit them. This includes the possibility of exporting the headers to a separate text file.

1. With the **Print Preview** window open, click .
2. In the **Save As** dialog box, select **Data Only**.
3. Select the **Allow Headers** check box.
4. Select the **Edit Headers** check box and click **OK**.
5. Select the required file format and file path and click **Save**.
6. In the **Edit Column Headers** dialog box, select the **Incl.** check box for the columns you want to include in the output file.
7. Under the **Header Text** column, edit the text as required.
8. Under the **Width** column, change the maximum text width (number of characters allowed) as required.
9. If you want to save the header settings in this screen to a text file:
 - a. Click **Export Headers**.
 - b. In the **Export to File** dialog box, navigate to the required location and enter a file name.
 - c. Click **Save**.

NOTE If an external header text file exists, you can click **Import Headers** to load the data into the **Export to File** dialog box.

Scale a Report to Fit Printer Paper Size

When printing a report, the size of the printed report is taken from the template selected in the **Enhanced Reports > File Locations (Preferences)**. For example, if you have selected **A4tall.sma** as the template file for your reports, all your reports are printed to fit A4 size paper. If you try to print to A3 size paper the report is still printed as if the paper is A4 size. To scale to fit a different sized paper from the one selected in the **File Locations** preferences, you must do the following:

1. In SmartPlant Instrumentation, click **File > Preferences > Enhanced Reports**.
2. Click  to expand the required report, for example **Enhanced Smart Loop**.
3. Click **Page and Revisions Options**.
4. In the **Page and scaling options** group box, from the **Scale to page size** list, select the size of the paper for printing, for example A3.
5. Click **OK**.
6. Generate the report.
7. At the **Report Preview** prompt, click **No** to send the report directly to the printer. The report is scaled to fit the size selected in the **Page and scaling options** and not printed according to the size in the report template.

NOTES

- If you preview the report in the Enhanced Report Utility, the paper size for printing is taken from the report template as selected in the **File Locations (Preferences)**.
- The following paper sizes are not supported by this function:

- A0 Tall
- A0 Wide
- A1 Tall
- A1 Wide
- A2 Tall
- A2 Wide

SECTION 3

Instrument Index Module

The Instrument Index module allows you to create, modify, and maintain a comprehensive database that contains all your instrumentation data.

The module offers tools for adding, editing, duplicating, and deleting loop and instrument tag numbers. Instrument types and their profiles are organized in a comprehensive fashion providing easy data entry. Other data, such as model and manufacturer, P&ID drawing numbers, lines, locations, I/O types, equipment names are organized in supporting tables.

The Instrument Index module also provides other functions that include item-oriented (tag, loop, and so forth), filtered, sorted and customizable database viewing options. You can generate reports in several formats, attaching remarks to items, creating specific summaries, and viewing and managing history.

Before working with the Instrument Index module make sure the Domain Administrator has defined the Loop and Tag naming conventions in the Administration Module. For more information, see *Naming Conventions* in the *Administration User's Guide*, under *Domain and Project Administration, Naming Conventions*.

See Also

Associating Instrument Tags with Loop Numbers (on page 107)

Working with Typical Loops and Tags (on page 111)

Generating Documents (on page 133)

Instrument Index Module Window

The Instrument Index Module window is the main entry point to all your instrument index activities.

The window consists of the following sections:

- **Menu bar** — Provides access to all the *Instrument Index Commands* (on page 65).
- **Application work area** — The area where other Instrument Index module windows and dialog boxes open.
- **Toolbar** — Provides access to the most common Instrument Index module commands.
- **Status bar** — Shows the current status or the pertinent Microhelp message, plant hierarchy items, and the current date and time.

Instrument Index Commands

The following commands are used when working in the Instrument Index module.

Icon	Commands	Explanation
	Edit > Tag Numbers > New Tag Number	Adds a new tag to the current domain
	Edit > Tag Numbers > Tag Number Properties	Edits the properties of a tag number that you select in the Enter Tag Number dialog box.
	Edit > Tag Numbers > Duplicate Tag Numbers	Duplicates a tag number that you select in the Enter Tag Number dialog box.

Icon	Commands	Explanation
None	Edit > Tag Numbers > Delete Tag Numbers	Deletes a tag number that you select in the Enter Tag Number dialog box.
None	Edit > Tag Numbers > Move Tag Number	Moves a tag number that you select in the Enter Tag Number dialog box to another <unit> <area> or <plant>.
	Edit > Loop Numbers > New Loop Number	Creates a new loop number.
	Edit > Loop Numbers > Loop Number Properties	Edits the properties of a loop that you select in the Enter Loop Number dialog box.
	Edit > Loop Numbers > Duplicate Loop Number	Creates a new loop by duplicating the properties of an existing loop.
None	Edit > Loop Numbers > Delete Loop Number	Deletes a loop number that you enter in the Enter Loop Number dialog box.
None	Edit > Loop Numbers > Move Loop Number	Moves a loop number that you select in the Enter Loop Number dialog box to another <unit> <area> or <plant>.
	Edit > Loop Numbers > Rename Multiple Loop Numbers	Renames a loop number.
None	Edit > Typical Loop Management	Opens the Typical Loop Management dialog box.
None	Edit > Batch Loop Creation	Opens the Batch Loop Creation dialog box.
None	Reports > All Tag Numbers	Opens the Report Selection Options dialog box for creating a tag summary report.
None	Reports > Available Tag Numeric Segments	Opens the Available Tag Numeric Segments dialog box to create a report of all the unused numeric segments of tag numbers in the current <unit> or <plant>.
None	Reports > Available Loop Numeric Segments	Opens the Available Loop Numeric Segments dialog box to create a report of all the unused numeric segments of loop numbers in the current <unit> or <plant>.
None	Reports > Loop Tag Numbers	Creates a report of loop numbers and their associated tags.
None	Reports > Loop Summary	Opens the Report Selection Options dialog box for creating a loop summary report.
None	Reports > Tables > Standard Instrument Type List	Creates an Instrument Type Report.
None	Reports > Tables > Detailed Instrument Type List	Creates a Detailed Instrument List Type Report.
None	Reports > Tables > Instrument Statuses	Creates an Instrument Status Report.
None	Reports > Tables > I/O Types	Creates an I/O Types Report.

Icon	Commands	Explanation
None	Reports > Tables > Equipment Type	Creates an Equipment Type Report.
None	Reports > Tables > Equipment	Creates an Equipment Report.
None	Reports > Tables > P&ID Drawing References	Creates a P&ID Drawing References Report.
None	Reports > Tables > Line Type	Creates a Line Type Report.
None	Reports > Tables > Lines	Creates a Lines Report.
None	Reports > Tables > Instrument Criticality	Creates an Instrument Criticality Report.
None	Reports > Tables > Instrument Manufacturers	Creates an Instrument Manufacturers Report.
None	Reports > Tables > Instrument Models	Creates an Instrument Models Report.
None	Reports > Tables > Loop Measured Variables	Creates a Loop Measured Variables report.
None	Reports > Tables > Function Blocks	Creates a Function Blocks Report.
None	Reports > Electrical Equipment Tables > Associated Electrical Equipment	Creates an Associated Electrical Equipment Report.
None	Reports > Electrical Equipment Tables > Associated Electrical Equipment & Types	Creates an Associated Electrical Equipment and Types Report.
None	Reports > Electrical Equipment Tables > Circuits	Creates a Circuits Report.
None	Reports > Telecom Devices	Creates a Telecom Devices Report.
None	Reports > Telecom Tables > Standard Telecom Type List	Creates a Telecom Type Report.
None	Reports > Telecom Tables > Detailed Telecom Type List	Creates a Telecom Type List Report.
None	Reports > Telecom Tables > Telecom Line Numbers	Creates a Telecom Line Numbers Report.
None	Reports > Telecom Tables > Telecom Field Equipment	Creates a Telecom Field Equipment Report.
None	Reports > Telecom Tables > Telecom Signal Levels	Creates a Telecom Signal Levels Report.
None	Reports > Power Supply Tables > Rated Voltage	Creates a Rated Voltage Report.
None	Reports > Power Supply Tables > Frequency	Creates a Frequency Report.
None	Reports > Power Supply Tables > Number of Phases	Creates a Number of Phases Report.

Icon	Commands	Explanation
None	Reports > Power Supply Tables > Operating Modes	Creates an Operating Modes Report.
	Actions > Browse Index	Opens an Instrument Index Standard Browser view.
	Actions > Associate	Opens the Associate Tag Number dialog box to associate a selected loop with tag numbers.
None	Tables > Instrument Types	Opens the Instrument Types dialog box.
None	Tables > General Process Function Sub-Categories	Opens the General Process Function Sub-Categories dialog box for defining a sub-category for the general process function.
None	Tables > Instrument Statuses	Opens the Instrument Statuses dialog box for maintaining the Status drop-down list.
None	Tables > I/O Types	Opens the I/O Types dialog box for maintaining the contents of the I/O Types list.
None	Tables > Instrument Locations	Opens the Instrument Locations dialog box for specifying general or specific instrument locations within the <plant>.
None	Tables > Equipment	Opens the Equipment dialog box for categorizing equipment that your instruments are installed on.
None	Tables > P&ID Drawing References	Opens the P&ID Drawing References dialog box.
None	Tables > Lines	Opens the Lines dialog box for categorizing and modifying line data.
None	Tables > Instrument Criticality	Opens the Instrument Criticality dialog box enabling you to customize instrument criticality data.
None	Tables > Instrument Certification	Opens the Instrument Certification supporting table that holds certification for instruments that are certified for hazardous environments.
None	Tables > Instrument Manufacturers	Opens the Instrument Manufacturers supporting table.
None	Tables > Instrument Models	Opens the Instrument Models dialog box where you store instrument model data.
None	Tables > Function blocks	Opens the Function blocks dialog box where you can add, delete, and modify user-defined function blocks.

Icon	Commands	Explanation
None	Tables > Intrinsically Safe Circuit Types	Opens the Intrinsically Safe Circuit Types dialog box.
None	Tables > Loop Measured Variables	Opens the Loop Measured Variables dialog box allowing you to enter or modify the loop process variable identifier which is used in the loop naming conventions.
None	Tables > Loop Types	Opens the Loop Types supporting table.
None	Tables > Loop Functions	Opens the Loop Functions dialog box allowing you to enter or modify the loop function identifier which is used in loop naming conventions.
None	Tables > Electrical Equipment > Associated Electrical Equipment	Opens the Associated Electrical Equipment Types dialog box. This allows you to view equipment tags that are associated with signals that are defined in SmartPlant Electrical and the equipment type to which each signal belongs.
None	Tables > Electrical Equipment > Associated Electrical Equipment Types	Opens the Associated Electrical Equipment Types dialog box. This shows all the available associated electrical equipment types to which SmartPlant Electrical signals can belong.
None	Tables > Electrical Equipment > Circuits	Opens the Electrical Equipment supporting table. This supporting table holds circuit values that appear in the Circuit list on the Electrical tab of the Tag Number Properties dialog box.
None	Tables > Telecom > Telecom Device Types	Opens the Telecom Device Types dialog box. You use this dialog box to create and manage telecom device types.
None	Tables > Telecom > Telecom Line Numbers	Opens the Telecom Line Numbers dialog box. You use this dialog box to maintain the contents of the Telecom line list when creating a telecom field device.
None	Tables > Telecom > Telecom Field Equipment	Opens the Telecom Field Equipment dialog box. You use this dialog box to maintain the contents of the Field Equipment drop-down list in the Tag Number Properties dialog box.
None	Tables > Telecom > Telecom Signal Levels	Opens the Telecom Signal Levels dialog box. You use this dialog box to maintain the contents of the Signal Level drop-down list in the Tag Number Properties dialog box.

Icon	Commands	Explanation
None	Tables > Power Supply > Rated Voltage	Opens the Rated Voltage supporting table. This shows the rated voltage values that you can use in the Rated voltage list on the Power Supply tab of the Tag Number Properties dialog box.
None	Tables > Power Supply > Frequency	Opens the Frequency supporting table. This shows the frequency values that you can use in the Frequency list on the Power Supply tab of the Tag Number Properties dialog box.
None	Tables > Power Supply > Number of Phases	Opens the Number of Phases supporting table. This shows the number of phase values that you can use in the Number of phases list on the Power Supply tab of the Tag Number Properties dialog box.
None	Tables > Power Supply > Operating Modes	Opens the Operating Modes supporting table. This shows the operating mode values that you can use in the Operating mode list on the Power Supply tab of the Tag Number Properties dialog box and the properties dialog boxes of panels that support power supply.
None	Tables > Signal Type	Opens the Signal Type dialog box that holds signal type values that are used to define HART instrument properties.
None	Tables > Linearity Types	Opens the Linearity Types dialog box that holds linearity type values that are used to define HART instrument properties.

SECTION 4

Managing Loop Numbers

SmartPlant Instrumentation allows you to easily create and manage loops throughout your <plant>. You can create unique numbered loops for each <unit> in your <plant>. Duplicate, rename, and move loops about your <plant> without losing critical information. Edit loop number information, change loop numbers, create new numbers, simply and quickly without creating a duplicate loop number within a <unit>, or losing any information. SmartPlant Instrumentation keeps track of all your loops making the necessary adjustments automatically.

Create a New Individual Loop Number

This option shows you how to create a new single loop number, in the **Domain Explorer** or in the Instrument Index module, and add it to your database.

1. On the **Domain Explorer**, expand your current <plant> hierarchy to display the **Loops** folder.
2. Right-click the **Loops** folder and on the shortcut menu, click **New > Loop**.
3. On the **New Loop Number** dialog box, type the name of the new loop number. For an explanation of the segments of a loop number see *Loop Number Naming Convention* (on page 72).
4. Click **OK** and, when prompted to create a new tag number, and associate it with the current loop, click **Yes**.
 - Click **No** if you only want to create a loop number. Then, following the current procedure from **Step 7**.
 - Click **Yes** if you want to create a tag number at this stage and associate it with the new loop.
5. If you clicked **Yes**, do the following:
 - a. The **New Tag Number** dialog box opens.
 - b. Type the tag number and click **OK**.
6. On the **Select Instrument Type** dialog box, select your instrument type and click **OK**.
7. The **Tag Number Properties** dialog box opens where you can define the general properties for your tag number. For details of the options available click the **Help** button in the **New Tag Number Properties** dialog box.
8. When you have finished click **OK** to open the **Loop Number Properties** dialog box.
9. On the **Loop Number Properties** dialog box, define the properties you want to associate with the loop number. For details of the options available click the **Help** button in the **Loop Number Properties** dialog box.
10. Click **OK** to close the **Loop Number Properties** dialog box.

NOTES

- The data field in the **New Loop Number** dialog box displays the loop name template which is based on the loop naming convention defined by the Domain Administrator. In the alphanumeric and the numeric parts of the name, you can type any character (letters, digits, spaces, and so forth). You can customize the loop name template but only the Domain Administrator can change the naming conventions. For more details see *Customize New Loop Numbers*.
- You can define a functional requirement while creating a new loop. For details, see *Define a Functional Requirement for a Loop* (on page 81).

Loop Number Naming Convention

When renaming existing loop numbers or creating new ones, make sure that the loop number names comply with the naming conventions set for the current <unit> by the Domain Administrator for the current <unit>. In the alphanumeric and the numeric parts of the name, you can type any character (letters, digits, spaces, and so forth).

Example Loop Number: **101- FIC - 2225/E**

Segment		Description
100	—	first segment of the loop number, derived from the loop naming convention defined by the Domain Administrator
F	—	measured variable
IC	—	loop function
2225	—	loop number
E	—	suffix

Duplicate a Loop Number

This option shows you how to create a new loop number by duplicating an existing one. SmartPlant Instrumentation creates a new loop number based on the properties of a source loop that you select. This feature is useful when you want to create a loop number similar to an existing one. You duplicate a loop number and then edit its properties as needed.

NOTE You can duplicate a loop number in the same <unit> as the source loop number or in any other <unit> of the current domain.

1. In the **Domain Explorer**, expand your current <plant> hierarchy to display the **Loops** folder.
2. Double-click the **Loops** folder to display the existing loops.
3. Right-click the loop you want to duplicate, and on the shortcut menu, click **Duplicate**.
4. On the **Duplicate Loop Number** dialog box, type the new loop number.

TIP The data field on the **Duplicate Loop Number** dialog box displays the loop name template based on the loop naming convention defined by the Domain Administrator. In the alphanumeric and the numeric parts of the name, you can type any character (letters, digits, spaces, and so forth).

5. If required, do the following to create the duplicated loop number in a different <unit> in the current domain:
 - a. On the **Duplicated Loop Number** dialog box, check the **Create in another unit** check box.
 - b. On the **Select Target Unit** dialog box, select the target unit.
 - c. Click **OK** to return to the **Duplicated Loop Number** dialog box.
 - d. Click **OK** in the **Duplicated Loop Number** dialog box.

IMPORTANT One of the following dialog boxes opens, depending on the defined Instrument naming convention:

- *Create Loop Tags* (7 or fewer segments).
- *Duplicated Tag Number* (8 or more segments).

Duplicating Loop Tags for 7 or Fewer Segments (Create Loop Tags Dialog Box)

To duplicate tags associated with the duplicated loop:

1. On the **Create Loop Tags** dialog box, select the appropriate check boxes beside the tag numbers that you want to create. The software duplicates the tags associated with the source loop and associates the new tags with the new loop number.
NOTE If you have more than one type of tag associated with the loop, for example; Conventional tags and Functional requirement tags, a **Create Loop Tags** dialog box will open for each tag type, one after the other.
2. Modify the names of the new tag numbers as needed.
NOTE You cannot change the separator.
3. Select **Copy the instrument type from the source tag numbers** to keep the instrument type of the source tags.
4. Click **Next** to move to the next tag type **Create Loop Tags** dialog box.
NOTE If you click **Next** after editing all the loop tag types a prompt will appear, click **Yes** to return to the first **Create Loop Tags** dialog box, or **No** to close the prompt.
5. Click **OK**, and when prompted, click either **Yes** to edit the tag properties for the tag you have duplicated, or **No** to duplicate the tag numbers with their existing parameter values.
6. On the **Loop Number Properties** dialog box, define the properties you want to associate with the loop number. For details of the options available click the **Help** button in the **Loop Number Properties** dialog box.
7. Define a functional requirement if needed. For details, see *Define a Functional Requirement for a Loop* (on page 81).
8. Click **OK**.

NOTES

- You can change the measured variable of the new loop number or keep it the same as the source one. New tag numbers associated with the new loop number will be affected accordingly, that is, the measured variable of the new tag numbers will change if the measured variable of the new duplicated loop is changed. For example, if you are duplicating Loop 101-F-102 and you change the measured variable of the new loop to T, the new tag numbers associated with the new loop number will change their instrument type in accordance with the new measured variable: source Tag Number 101-FE-102 will change to 101-TE-102.
- You can also duplicate a loop number from the Instrument Index module. On the **Instrument Index Module** window, click  or on the menu bar, click **Edit > Loop Numbers > Duplicate Loop Number**.

Duplicating Loop Tags for 8 and Above Segments (Duplicated Tag Number Dialog Box)

To duplicate tags associated with the duplicated loop:

1. On the **Duplicated Tag Number** dialog box, modify the name of the new tag number as needed.

NOTE You cannot change the separator.

2. Click **OK**.

The software duplicates the tag associated with the source loop and associates the new tag with the new loop number.

NOTE If you have more than one tag associated with the loop, a **Duplicated Tag Number** dialog box will open for each tag, one after the other.

3. When prompted, click **Yes** to edit the tag properties for the tag you have duplicated, or **No** to duplicate the tag numbers with their existing parameter values.
4. On the **Loop Number Properties** dialog box, define the properties you want to associate with the loop number.

TIP For details of the options available click the **Help** button in the **Loop Number Properties** dialog box.

5. Define a functional requirement if required. For details, see *Define a Functional Requirement for a Loop* (on page 81).
6. Click **OK**.

NOTES

- You can change the measured variable of the new loop number or keep it the same as the source one. New tag numbers associated with the new loop number will be affected accordingly, that is, the measured variable of the new tag numbers will change if the measured variable of the new duplicated loop is changed. For example, if you are duplicating Loop 101-F-102 and you change the measured variable of the new loop to T, the new tag numbers associated with the new loop number will change their instrument type in accordance with the new measured variable: source Tag Number 101-FE-102 will change to 101-TE- 102.
- You can also duplicate a loop number from the Instrument Index module. On the **Instrument Index Module** window, click  or on the menu bar, click **Edit > Loop Numbers > Duplicate Loop Number**.

Move Loop Numbers

This option shows you to select one loop number or a group of loop numbers and move them to another <unit> in the current <plant>.

1. Start the **Instrument Index Module** by doing one of the following:
 - Click .
 - Click **Modules > Instrument Index**.
2. On the Instrument Index menu bar click **Edit > Loop Numbers > Move Number**.
3. On the **Enter Loop Number** dialog box, do one of the following:
 - To move one loop number, type the required loop number.
 - To move a group of loop numbers, click **Find**.
 - In the **Find Loop** dialog box click **Find** again .

- In the **Search results** data window, hold down **Ctrl** and highlight the required loop numbers, or select the **Select all** check box to move all the displayed loop numbers.
- 4. Click **OK**.
- 5. On the **Select Target <Unit>** dialog box, select the <unit> to which you want to move the selected loop numbers.
- 6. Click **OK**.

Edit Loop Number Properties from the Domain Explorer

This option allows you to modify the properties of an existing loop number from the **Domain Explorer**. You can also edit the target loop number when duplicating an existing loop number.

1. On the **Domain Explorer**, expand your current <plant> hierarchy to display the **Loops** folder
2. Double-click the **Loops** folder to display the existing loops.
3. Right-click a loop, then click **Properties**.
4. On the **Loop Number Properties** dialog box, edit the loop properties by entering values or selecting values from the lists.

TIP If needed, click the  button beside an appropriate list arrow to open the pertinent supporting table where you can rename a loop number, add, edit, or delete an item on the list.

5. Select **Display old loop number automatically** under **Preferences > Instrument Index > Rename**, for the **Old loop number** field to automatically display the old loop number when renaming a loop.
6. You can define a functional requirement while creating a new loop. For details, see *Define a Functional Requirement for a Loop* (on page 81).
7. Select **Apply P&ID drawing to tags** to apply the P&ID drawing number data to any new tag numbers that will be subsequently associated with this loop. Then, in the **Loop Browser View** window (in the Browser module), you can select a different drawing number (if available) and propagate it to all tag numbers associated with this loop. If you are editing an existing loop which is already associated with a P&ID drawing number, selecting this option replaces the existing drawing number values with the new drawing number that you enter in the P&ID drawing field.
8. Select the **Apply service to tags** check box to download the loop service to any new tag numbers that will be subsequently associated with the current loop. If you are editing an existing loop which is already associated with tag numbers, selecting this option replaces the existing tag service values with the new loop service that you type in the **Loop service field**.
9. Select **Apply equipment to tags** to apply the equipment data to any new tag numbers to be subsequently associated with this loop.

TIPS

- If you clear the **Apply P&ID drawing to tags** check box, you will still be able to define a P&ID drawing reference for subsequently associated new tag numbers by selecting a required drawing number from the **P&ID list** in the **Tag Number Properties** dialog box.
 - If the loop you are editing already contains associated equipment, selecting this option replaces the existing equipment values with the new equipment that you type in the **Loop equipment field**.
10. Select the **Update document number** check box to update the document number of the associated loop drawing.

TIP A document number naming convention can contain segments that represent loop number properties. Therefore, if you select this check box, changing a loop number property that is used in the document number segment also changes the document numbers in accordance with this change. After you select this check box, the software updates numbers of all documents containing the current loop number. For the current loop number, the software overrides the default or user-defined numbers of all the documents that appear in the Loop Drawing List dialog box of the Loop Drawings module. For details on document number naming conventions, see the *Administration module Help, Document Number Naming Convention Examples*.

11. Click **OK**.
12. At the prompt, do one of the following:
 - Click **Yes** to edit the tag numbers associated with the current loop.
 - Click **No** to close the **Loop Number Properties** dialog box and save new loop number values without editing the associated tag numbers.

Edit Loop Properties from the Instrument Index Module

This option allows you to modify the properties of an existing loop number from the Instrument Index module. You can also edit the target loop number when duplicating an existing loop number.

1. To start the **Instrument Index Module** do one of the following:
 - Click .
 - Click **Modules > Instrument Index**.
2. In the **Instrument Index Module** window, do one of the following:
 - Click .
 - Click **Edit > Loop Numbers > Loop Number Properties**.
3. In the **Enter Loop Name** dialog box, do one of the following:
 - Type the loop number that you want to edit and click **OK**.
 - Click **Find** without entering any loop number and in the Find Loop dialog box click **Find**. Select the loop number whose properties you want to edit in the **Search results** data window, and click **OK**.
4. In the **Loop Number Properties** dialog box, edit the loop properties by entering values or selecting values from the lists.

TIPS

- If needed, click the  button beside an appropriate list arrow to open the pertinent supporting table where you can rename a loop number, add, edit, or delete an item on the list.
- Select **Display old loop number automatically** under **Preferences > Instrument Index > Rename**, for the **Old loop number** field to automatically display the old loop number when renaming a loop.
- You can define a functional requirement while creating a new loop. For details, see *Define a Functional Requirement for a Loop* (on page 81).

5. Select **Apply P&ID drawing to tags** to apply the P&ID drawing number data to any new tag numbers that will be subsequently associated with this loop. Then, in the **Loop Browser View** window (in the Browser module), you can select a different drawing number (if available) and propagate it to all tag numbers associated with this loop. If you are editing an existing loop which is already associated with a P&ID drawing number, selecting this option replaces the existing drawing number values with the new drawing number that you enter in the P&ID drawing field.
6. Select the **Apply service to tags** check box to download the loop service to any new tag numbers that will be subsequently associated with the current loop. If you are editing an existing loop which is already associated with tag numbers, selecting this option replaces the existing tag service values with the new loop service that you type in the **Loop service field**.
7. Select **Apply equipment to tags** to apply the equipment data to any new tag numbers to be subsequently associated with this loop.

TIPS

- If you clear the **Apply P&ID drawing to tags** check box, you will still be able to define a P&ID drawing reference for subsequently associated new tag numbers by selecting a required drawing number from the **P&ID list** in the **Tag Number Properties** dialog box.
 - If the loop you are editing already contains associated equipment, selecting this option replaces the existing equipment values with the new equipment that you type in the Loop equipment field.
8. Select the **Update document number** check box to update the document number of the associated loop drawing.

TIP

A document number naming convention can contain segments that represent loop number properties. Therefore, if you select this check box, changing a loop number property that is used in the document number segment also changes the document numbers in accordance with this change. After you select this check box, the software updates numbers of all documents containing the current loop number. For the current loop number, the software overrides the default or user-defined numbers of all the documents that appear in the Loop Drawing List dialog box of the Loop Drawings module. For details on document number naming conventions, see the Administration module Help, Document Number Naming Convention Examples.
 9. Click **OK**.
 10. At the prompt, do one of the following:
 - Click **Yes** to edit the tag numbers associated with the current loop.
 - Click **No** to close the **Loop Number Properties** dialog box and save new loop number values without editing the associated tag numbers.

Edit Multiple Loop Numbers

This option shows you how to select a group of loop numbers and modify the profile of these loop numbers. This option is especially effective if you do not want to edit the tag numbers associated with the loops you are editing.

1. Start the **Instrument Index Module** by doing one of the following:
 - Click .
 - Click **Modules > Instrument Index**.
2. In the **Instrument Index Module** window, do one of the following:
 - Click .
 - Click **Edit > Loop Numbers > Loop Number Properties**.

3. On the **Enter Loop Number** dialog box, click **Find** without typing any loop number.
4. On the **Find Loop** dialog box, click **Find**.
5. On the **Search results data** window, select the loop numbers you require. You can hold down the **Ctrl** key and select a group of loop numbers or check the **Select all** check box.
6. Click **OK**.
7. On the **Loop Number Properties** dialog box, edit the loop properties by entering values or selecting values from the lists.

TIP If needed, click the  button beside an appropriate list arrow to open the supporting table where you can rename a loop number, add, edit, or delete an item on the list.
8. Select **Apply service to tags** to apply the loop service of the current loop number to the associated tag numbers.
9. Select **Apply P&ID to tags** to propagate the P&ID drawing number data to all the tag numbers associated with the current loop number.
10. Select **Apply equipment to tags** to propagate the equipment data to all the tag numbers associated with the current loop number.
11. Click **Next** to edit the properties of another loop.

TIP When you save the new loop number values, the software does not update the properties of the tags associated with the loop numbers you are editing. When editing multiple loop numbers, the software does not prompt you to edit the associated tag numbers. For more details on editing tags see *Edit Instrument Tags from the Instrument Index* (on page 93).
12. Click **OK** to close the Loop Number dialog box and save new loop number values.

Create a Loop Number When Editing a Tag

This option shows you how to create a new loop number on the fly while editing a tag number. You can then associate the current tag number with that new loop you are creating.

1. From the **Domain Explorer** select the tag you want to edit.
2. Right click the tag and select **Properties**.
3. On the **Tag Number Properties** dialog box, click **New Loop**.
4. On the **New Loop Number** dialog box, type the name of the new loop number and click **OK**. For an explanation of the segments of a loop number see *Loop Number Naming Convention* (on page 72).
5. Edit the properties of the new loop number as required in the **Loop Number Properties** dialog box and click **OK**.
6. On the **Tag Number Properties** dialog box, click **OK**.

Delete Loop Numbers

This option shows you how to delete loop numbers that are no longer required. You can delete a single loop number or several ones as needed. When deleting a loop number, several batch deletion options are possible depending on your loop number deletion preference settings. You can delete several loop numbers in batch mode (without being prompted to confirm each deletion) or delete several loop numbers one by one, confirming the deletion of each loop number.

NOTE If you are deleting a loop number associated with wiring, SmartPlant Instrumentation automatically disconnects all the required instruments.

1. On the Instrument Index module menu bar, click **Edit > Loop Numbers > Delete Loop Number**.

2. On the **Enter Loop Name** dialog box, do one of the following:
 - Type the loop number that you want to delete.
 - Click **Find** without typing a loop number, so that you can select several loop numbers for deletion in the **Find Loop** dialog box.
3. On the **Find Loop** dialog box, if required, click the **Find loops with one or more fieldbus tags** check box to narrow your search results to loops that contain tags with a fieldbus system I/O type.
4. Click **Find**.

TIP You can view more loop number rows, select **Show more search results**.
5. On the **Search results** data window, select the loop numbers that you want to delete and click **OK**.
6. On the **Delete Loop Number** dialog box, click **Delete**.

TIP If there are any tag numbers associated with the Loop Number a prompt box will ask you if you want to delete all associated tag numbers. Click **Yes** to delete, or **No** to save the tag numbers

NOTES

- If you are deleting several loop numbers and you have selected the **Skip deletion confirmation** option in your loop deletion preferences, all the loop numbers you have highlighted in the **Search results** data window will be deleted on the fly without prompting to confirm each deletion.
- You can also delete one or more loop numbers using the **Domain Explorer** without opening the Instrument Index module. In the tree view of the **Domain Explorer**, click the **Loops** folder. Then, in the **Items** pane, select the loops you want to delete. Right-click the selected loop numbers and then click **Delete**. For more information about the **Domain Explorer**, see *SmartPlant Instrumentation Explorer* (on page 517).

Rename a Single Loop Number

This option shows you how to rename a single loop number.

1. Start the **Instrument Index Module** by doing one of the following:
 - Click .
 - Click **Modules > Instrument Index**.
2. On the **Instrument Index Module**, do one of the following:
 - Click .
 - Click **Edit > Loop Numbers > Loop Number Properties**.
3. On the **Enter Loop Number** dialog box type the name of the loop that you want to rename and click **OK** or do the following:
 - On the **Enter Loop Number** dialog box, click **Find** without typing any loop number.
 - On the **Find Loop** dialog box click **Find**.
 - Select the loop number from the **Search results** dialog box and click **OK**.
4. On the **Loop Number Properties** dialog box, click  next to the **Loop number** field.
5. On the **Rename Loop Number** dialog box, type the new loop number name.
6. Click **OK**.

7. On the **Loop Number Properties** dialog box click **OK**.

TIPS

- If you set the preferences to open the **Rename Loop Drawing File** dialog box after renaming a loop number, do the following to rename the file name of the associated CAD drawing. In the **Rename Loop Drawing File** dialog box, select a check box beside a desired file name. Type a new name over the name displayed in the **New Drawing File** column.
- If more than one file appears in the data window, the drawing type is multi-drawing.

NOTES

- You can rename the drawing file name if the loop number that you are renaming is associated with a CAD loop drawing. To do this, set a preference on the **Rename** page of the **Preferences Dialog** box before performing this procedure. For more details see *Set Preference for Renaming A CAD File from A Loop Number* (on page 80).
- Make sure that your new loop number name complies with the naming conventions for the current <unit>.
- All loop numbers must have unique names in the current <unit>.

Set Preference for Renaming A CAD File from A Loop Number

1. Click **File > Preferences**.
2. In the **Tree View** pane, double click the **Instrument Index** icon.
3. Click the **Rename** icon.
4. Select the **Rename drawing file name when renaming the loop** check box.
5. Click **OK**.

Rename Multiple Loop Numbers

This option shows you how to rename multiple loop numbers in the current <unit>. You can also modify the loop number service and edit associated tag numbers if required.

1. Start the **Instrument Index Module** by doing one of the following:
 - Click .
 - Click **Modules > Instrument Index**.
2. On the **Instrument Index Module**, do one of the following:
 - Click .
 - Click **Edit > Loop Numbers > Rename Multiple Loop Numbers**.
3. On the **Enter Loop Number** dialog box, click **Find**.
4. On the **Find Loop** dialog box, click **Find** again.
5. On the **Search results data** window, select the loop numbers you require. You can hold down the **Ctrl** key and select a group of loop numbers or check the **Select all** check box.
6. Click **OK**.
7. On the **Rename Multiple Loop Numbers** dialog box, do the following:
 - a. Select the **Select** check box next to each loop number that you want to rename, or select the **Select all** check box to rename all the loops in the **Rename Multiple Loop Numbers** dialog box.
 - b. On the **New Loop Number** field, type the new loop number name.
 - c. Click the **Loop Service** field and modify the value if needed.

- d. Select the **Edit tag numbers** check box to edit the properties of the tag numbers associated with the selected loop numbers after you rename these loop numbers
- e. Click **Rename**.
- f. On the **Tag Number Properties** dialog box, edit the properties of the tag numbers you have chosen.
- g. Click **OK**.
- h. The **Rename Multiple Loop Numbers** dialog box reopens.

TIP If after clicking **Rename** some of the selected loop numbers have not been renamed, the **Result** field of the **Rename Multiple Loop Numbers** dialog box displays the reason why you could not rename these loop numbers.

- i. Click **Close**.

NOTE Make sure that your new loop number names comply with the naming conventions of the current <unit>. All loop numbers must have unique names in the current <unit>.

Define a Functional Requirement for a Loop

This option shows you to define a functional requirement for a selected loop number. Functional requirement is the combination of loop function and process function data for a specific loop. For example, for Loop FIC-100, F refers to process function and IC to process function. C can be interpreted as measuring and control. During the early stages of a project, the loop functional requirements are known. However, the functional requirements for the project devices are not known yet. To make cost estimations during the early stages of your project, you need loop functional requirements that contain process data, such as loop number, DN, pipe specifications, and so forth. Later on in your project, you can copy these functional requirements to the real devices.

NOTE You can define multiple functional requirements for a specific loop number. Also, you can generate a specification for a loop that has a functional requirement.

1. Create or edit a loop number.
2. On the **Loop Number Properties** dialog box, click **Func. Req.**.
3. On the **New Tag Number** dialog box, under **Tag number** type the new tag number name and click **OK**.
4. On the **Select Process Function** dialog box, select the process function that you need and click **OK**.
5. On the **Tag Number Properties** dialog box, define the properties of the new tag number as you require.
6. Click **OK**.

SECTION 5

Working with Instrument Types

You use instrument type to identify and classify instruments in SmartPlant Instrumentation. SmartPlant Instrumentation provides a number of predefined instrument types, such as FE, PT, and so forth. You can add new instrument types and modify the shipped instrument types as required. You can also delete an instrument type that is not in use, but the software does not let you delete an instrument type that you already used to create a tag number.

SmartPlant Instrumentation uses standard function identifier acronyms to identify instrument types. However, some function identifier acronyms are not unique and are used for more than one instrument type. For instance, FE can refer to D/P Type Flow Element or a Mass Flow Sensor. As a result, when creating a new tag number with such an acronym, the software opens the **Select Instrument Type** dialog box where you select the appropriate instrument type.

You classify all instrument types in SmartPlant Instrumentation according to process function. You use process function to associate an instrument with a specific type of specification, process data, and calculation sheet. For example, if you need to associate a tag number with a specification that contains flow information, this tag number must have an instrument type that belongs to the Flow process function.

For each instrument type that you define, you also set a profile definition that allows you to automate the creation of tag numbers with a number of predefined properties.

When defining an instrument type, you also define its profile. Instrument type profile allows you to automate the creation of tag numbers with a number of predefined properties. When you create a tag number whose instrument type includes a profile, the software automatically creates and associates a number of items that you chose in the instrument type profile that serves as a basis for the new tag number.

Define an Instrument Type

Use this procedure to define a new instrument type, or edit the properties of an existing instrument type.

1. On the Instrument Index module menu bar, click **Tables > Instrument Types**.
2. In the **Instrument Types** dialog box, from the **Process function** list, select the process function that you require.
3. Do one of the following:
 - Click **New** to append a new data row in the data window.
 - Click a selected row to edit the values of an existing instrument type.
4. Under **Instrument Type**, type an instrument type acronym. You can have duplicate acronyms if needed.

TIP If you have duplicate instrument type acronyms, when creating new tags based on such an instrument type, SmartPlant Instrumentation opens the **Select Instrument Type** dialog box and lets you select the exact instrument type that you require for the new instrument.
5. Under **Description**, type a brief description as desired.
6. Under **CS Tag Instrument Type Alias**, type an alias for a control system tag instrument type. Do this only if you want to create control system tags that will have an alias instrument type associated with the current instrument type. Leave this field blank if you are not going to create CS tags based on the current instrument type or if you want the CS tags to have the same instrument type as the tag number.

7. If you selected the **General** process function, under **General Process Function Sub-Category**, select a value that you predefined in the **General Process Function Sub-Category** supporting table. For details, see *Define a General Process Function* (on page 84).

Define a General Process Function

Use this procedure to create a sub-category for the General process function. You can then select one of the sub-category values for any General process function in the data window of the **Instrument Types** dialog box.

1. On the Instrument Index module menu bar, click **Tables > General Process Function Sub-Category**.
2. Click **New** to append a new data row.
3. Type the new sub-category name, for example, Mechanical, Electrical, and a description, as you require.

Define an Instrument Type Profile

Use this procedure to define a profile for each instrument type that you use. An instrument type profile is a group of default settings that allow you to create new instruments with certain predefined properties, associations, documents, and wiring items. For example, when creating an instrument, you can automatically create the instrument specification, reference device panel and cable, associate the instrument with a specific hook-up, and so forth.

1. On the **Instrument Index Module** window menu bar, click **Tables > Instrument Types**.
2. From the **Process function** list, select the process function that you require.
3. In the data window, select the instrument type for which you want to define profile options.
4. Click **Profile**.
5. Make your definitions as you require.

IMPORTANT

- Make sure that your preferences on the **Instrument Index > Profile** page of the **Preferences** dialog box are set to activate the options that you require. These preferences only apply when you create new instruments. For example, if you clear the **Specifications** check box, when creating a tag number, the software ignores specification creation options defined on the **General** tab of the **Instrument Type Profile** dialog box and creates the tag without any specification. If you then manually generate a specification for the created tag, the software applies the existing instrument type profile options.
- Preferences on the **Instrument Index > Profile** page of the **Preferences** dialog box do not apply to the settings on the **Calibration** tab of the **Instrument Type Profile** dialog box.

Define a Wiring and Controls System Instrument Type Profile

Use this procedure to set the wiring and control system default settings allowing you to create new tag numbers with the settings that you defined for the instrument type. For example, you can automatically define new instruments as control-system-enabled so that new tag numbers with the current instrument type profile will be part of a control system and be able to send and receive signals. You can also include automatic creation of control system (CS) tags, selection of reference panels and cables, and connector definitions.

1. On the **Instrument Index Module** menu bar, click **Tables > Instrument Types**.
2. On the **Instrument Types** dialog box, from the **Process function** list, select the process function type.
3. Do one of the following:
 - Create a new instrument type.
 - On the data window, select an existing instrument type.
4. Click **Profile**.
5. On the **Instrument Type Profile** dialog box, on the **General** tab, you can edit fields as needed.
6. On the **Wiring and Control System** tab, select the **Include wiring** check box.
7. To define new instrument tags as control-system-enabled, select the **Control system** check box. This enables the corresponding tag numbers for tag assignment.
8. To enable automated creation of coupled control system tags, select **Automatic CS tags**.
9. From the **Reference device panel** list, select an appropriate reference panel for this instrument type. These are device panels that were created in **Reference Explorer**.
10. If your reference device panel settings enable the **Conventional connections** group box, do one of the following for each connection that you need for the current instrument type:
 - Click **New**, to add a connection.
 - Click **Properties**, to edit the properties of an existing convention, and on the **Conventional Connection Properties** dialog box, define the settings that you require, and click **OK**.
11. If your reference device panel settings enable the **Plug-and-socket connections** group box, do one of the following for each connection that you need for the current instrument type:
 - Click **New**, to add a connection.
 - Click **Properties**, to edit the properties of an existing convention, and on the **Plug-and-Socket Connection Properties** dialog box, define the settings that you require, and click **OK**.

NOTES

- SmartPlant Instrumentation creates the wiring items according to an instrument type profile, it always connects the created cable to the right side of the panel that it creates. Therefore, you are not allowed to select a left-oriented terminal from the **Starting terminal** list on the **Conventional Connection Properties** dialog box. You can check the configuration of a terminal by right-clicking it in the **Domain Explorer** and selecting **Properties** on the shortcut menu.
- SmartPlant Instrumentation does not allow you to define a wiring instrument type profile that enables connections on the left side of a device panel.

Copy Instrument Type Profile Data

Use this procedure to copy instrument type profile data from one instrument type to another. This procedure is useful when you want to define instrument types with similar profile properties. This way you do not need to define all the profile data for a new instrument type from scratch. After completing this procedure, you can access the profile associated with the target instrument type and change the required properties.

1. On the **Instrument Index** module menu bar, select **Tables > Instrument Types**.
2. From the **Process function** list, select the process function that you require.
3. Click **Profile**.
4. On the **Instrument Type Profile** dialog box, click **Copy From** to open the **Copy Instrument Type Profile Data** dialog box.
5. From the **Process function** list, select the required process function.
6. In the data window, select the instrument type whose profile data you want to copy.
7. Click **OK** to reopen the **Instrument Type Profile** dialog box, where you can view the new profile properties.
8. Define the instrument type profile as you require.

TIPS

- If you want to copy the specification profile properties, note that both the source and the target instrument type must belong to the same process function. When the source and the target instrument type belong to different process functions, the system copies the data without the specification profile properties.
- When copying instrument type profile settings, the software ignores the definitions on the **Calibration** profile tab.

Set an Alias Control System Tag

Use this procedure to create an alias for automatically created CS tags. When creating CS tags automatically, you can instruct SmartPlant Instrumentation to use CS tag naming conventions or use the shipped predefined naming convention for CS tags. SmartPlant Instrumentation will name new CS tags according to the rules you set only after the Domain Administrator has set the control system tag naming conventions for the current <unit>. If the CS tag naming conventions have not been set, the software uses the following predefined rule for all automatically created CS tags:

INSTRUMENT TYPE + NUMBER + \SUFFIX After the Domain Administrator defines the control system tag naming conventions for the current <unit>, you can decide whether to use the tag number's instrument type for the CS tag or set an alias for the new CS tags. If you do not set an alias for these CS tags, SmartPlant Instrumentation names them according to the instrument type of the tag numbers with which they are created. Note that the length of the alias text should not exceed the length of the instrument type alias string defined by the Domain Administrator on the **Naming Conventions** dialog box.

1. Check that your Domain Administrator has set the naming conventions for control system tags that you create in the current <unit> .
2. Define the instrument type profile for the required tag numbers and enable the automatic creation of CS tags. For more details, see *Define an Instrument Type* (on page 83).
3. In the **Instrument Types** dialog box, highlight the required instrument type.
4. Click in the **CS Tag Instrument Type Alias** field for the selected instrument type and enter the CS alias by overtyping the displayed value.
5. Click **OK** to accept your settings and close the **Instrument Types** dialog box.

NOTE The CS tag alias will be enabled only if the Domain Administrator has selected **INST. TYPE ALIAS** from the **Description** list on the **Naming Conventions** dialog box when setting the control system tag naming conventions.

Apply All Existing Profiles

Use this procedure to create the following items specified in the for selected instruments in an Instrument Index Standard Browser view: instrument specifications, control system tags, and device panels and cables.

1. Open an Instrument Index Standard Browser view.
2. Select the desired tag numbers.
3. Do one of the following:
 - Right-click, and on the shortcut menu, click **Apply Profile > Apply All Profile Options**.
 - Click **Actions > Apply Profile > Apply All Profile Options**.
4. In the **Results** dialog box, view the results for each set of items, and then click **Close**.

NOTES

- To make this feature work, you must select the appropriate check boxes and options in the instrument type profile of the selected tag number. For more details, see *Define an Instrument Type Profile* (on page 84).
- This option applies all the instrument type profile options to the selected tag numbers, regardless of the settings defined on the **Instrument Index > Profile** page of the **Preferences** dialog box.
- This option does not affect instrument profile options for items other than specifications, control system tags, and device panels and cables.
- If you are applying a profile that has custom table definitions, the software creates the custom tables and overwrites the data of the previously created custom tables for the current tag numbers.

SECTION 6

Managing Instrument Tags

SmartPlant Instrumentation allows you to easily create and manage instrument tags throughout your <plant>. You can create unique numbered tags for each <unit> in your <plant>. Duplicate, rename, and move tags about your <plant> without losing critical information. Define each instrument tag simply. Easily add or remove instrument tags from loops, without creating a duplicate instrument tag, or losing any information. SmartPlant Instrumentation keeps track of all your instrument tags, automatically making the necessary adjustments as you work.

Instrument Tag Naming Convention

The data field displays the instrument tag name template which is based on the tag naming convention defined by the Domain Administrator for the current <unit>. In the alphanumeric and the numeric parts of the name, you can type any character (letters, digits, spaces, and so forth). You can customize the tag name template to set a default, but only the Domain Administrator can change the naming conventions. For more details see *Customize Tag Name* (on page 93).

Example: **101- FE - 2225/E**

Segment	Description
100	Prefix derived from the tag naming convention defined by the Domain Administrator
FE	Measured variable
2225	Loop number that the tag is associated with
E	Suffix

NOTES

- Though the naming conventions do not apply to tags classed as electrical, you cannot create an electrical tag until the naming convention for conventional instruments has been defined.
- In order to trim extra spaces in a tag name, enable the **Trim Instrument Tag Names** rule. In SmartPlant Instrumentation Rule Manager, expand the **Instrument Index > Consistency** hierarchy. Double-click the **Trim Instrument Tag Names** rule and then clear the **Disable rule** check box on the **General** tab of the **Rule Properties** dialog box. Note that this rule is provided to you as part of the shipped data.

Create an Instrument in the Domain Explorer

This option shows you how to create an instrument in the **Domain Explorer**. When you define new instruments, the software creates them according to the instrument type profiles that you defined in the **Instrument Type Profile** dialog box for a selected instrument type. Defining a profile allows you to set instrument type default settings for new instrument tags and thus create them with certain predefined properties based on the instrument type you select for the new instrument. You set profiles for every instrument type that you use. Consequently, make sure that you set and activate all the required instrument type profiles before you start creating new instruments.

1. Press F7 to open the **Domain Explorer**.
2. Expand the plant hierarchy to display the **Instruments** and **Loops** folders.
3. Do one of the following:
 - To create an instrument that is not associated with any loop number, right-click the Instruments folder and on the shortcut menu click **New > Instrument**.
 - To create an instrument that is associated with a specific loop number, expand the **Loops** folder, right click the required loop, and click **New > Instrument**.
4. On the **New Tag Number** dialog box, do the following:
 - a. From the **Tag class** list, select the desired tag class according to whether you want to create a conventional, Foundation Fieldbus, HART instrument, soft tags, Telecom tag, and so forth.
 - b. Type the name of the new tag. For details on instrument tag naming conventions see *Instrument Tag Naming Convention* (on page 89).
 - c. Click **OK**.
 - d. If the **Select Instrument Type** dialog box opens (because there is more than one record for a given instrument type acronym), select the required instrument type and click **OK**.

TIPS

- If the tag name does not correspond to an existing loop name, you are prompted to enter a loop name based on the tag you have entered. If the loop identifier already matches an existing loop, then the new tag name will automatically be associated with the loop.
 - If the loop convention includes the loop function parameter, the prompt will always appear. In this case, you have to complete the loop name. If a profile exists for the selected instrument type, any new tags for that instrument type will be created with the selected default settings.
5. On the **Loop Name** dialog box, do one of the following:
 - Type the loop number that the new tag is to be associated with.
 - Accept the displayed loop number.
 - Click **Cancel** to create the tag number without a loop association.
 6. Click **OK**.
 7. On the **Loop Number Properties** dialog box, accept the loop number properties or modify them as required and then click **OK**.

TIP The **Loop Number Properties** dialog box only opens if the tag number is associated with a loop number.

8. On the **Tag Properties** dialog box enter the properties as required, and click **OK**. For details on entering power supply data (not available if the selected **Tag Class** is electrical), see *Enter Power Supply Data for Panels and Instrument Tags* (on page 94)

NOTES

- You can also create a new instrument tag in the Instrument Index module. For more details, see *Create an Instrument Tag in the Instrument Index Module* (on page 91).
- When creating a new tag, you can determine whether or not process data is required for it, and if so, at what stage the information should be entered by a process engineer. For more details of workflow implementation, see *Workflow* (on page 54).
- In order to trim extra spaces in a tag name, enable the **Trim Instrument Tag Names** rule. In SmartPlant Instrumentation Rule Manager, expand the **Instrument Index > Consistency** hierarchy. Double-click the **Trim Instrument Tag Names** rule and then clear the **Disable rule** check box on the **General** tab of the **Rule Properties** dialog box. Note that this rule is provided to you as part of the shipped data.

Create an Instrument Tag in the Instrument Index Module

This option shows you how to create an instrument in the Instrument Index module. When you define new instruments, the software creates them according to the instrument type profiles that you defined in the **Instrument Type Profile** dialog box for a selected instrument type. Defining a profile allows you to set instrument type default settings for new instrument tags and thus create them with certain predefined properties based on the instrument type you select for the new instrument. You set profiles for every instrument type that you use. Consequently, make sure that you set and activate all the required instrument type profiles before you start creating new instruments.

1. To start the Instrument Index module do one of the following:
 - Click .
 - Click **Modules > Instrument Index**.
2. Do one of the following:
 - Click **Edit > Tag Numbers > New Tag Number**.
 - Click **New Tag** .
3. On the **New Tag Number** dialog box, do the following:
 - a. From the **Tag class** list, select the desired tag class according to what you want to create (For example: conventional, Foundation Fieldbus, HART instrument, soft tags or Telecom tag).
 - b. Type the name of the new instrument tag. For details on instrument tag naming conventions, see *Instrument Tag Naming Convention* (on page 89).
 - c. Click **OK**.
 - d. If the **Select Instrument Type** dialog box opens (because there is more than one record for a given instrument type acronym), select the required instrument type and click **OK**.

TIPS

- If the instrument tag name does not correspond to an existing loop name, you are prompted to enter a loop name based on the instrument tag name you have entered. If the loop identifier already matches an existing loop, then the new tag name will automatically be associated with the loop.
- If the loop convention includes the loop function parameter, the prompt will always appear. In this case, you have to complete the loop number. If a profile exists for the selected instrument type, any new tags for that instrument type will be created with the selected default settings.

4. On the **Loop Name** dialog box, do one of the following:
 - Type the loop number that the new tag is to be associated with.
 - Accept the displayed loop number.
 - Click **Cancel** to create the tag name without a loop association.
5. Click **OK**.
6. On the **Loop Number Properties** dialog box, accept the loop number properties or modify them as required and then click **OK**.
TIP The **Loop Number Properties** dialog box only opens if the tag number is associated with a loop number.
7. On the **Tag Properties** dialog box enter the properties as required and click **OK**. For details on entering power supply data (not available if the selected **Tag Class** is electrical), see *Enter Power Supply Data for Panels and Instrument Tags* (on page 94).

NOTES

- You can also create a new instrument tag in the **Domain Explorer** without opening the Instrument Index module. For more details, see *Create an Instrument in the Domain Explorer* (on page 90).
- When creating a new instrument tag, you can determine whether or not process data is required for it, and if so, at what stage the information should be entered by a process engineer. For more details of workflow implementation, see *Workflow* (on page 54).
- In order to trim extra spaces in a tag name, enable the **Trim Instrument Tag Names** rule. In SmartPlant Instrumentation Rule Manager, expand the **Instrument Index > Consistency** hierarchy. Double-click the **Trim Instrument Tag Names** rule and then clear the **Disable rule** check box on the **General** tab of the **Rule Properties** dialog box. Note that this rule is provided to you as part of the shipped data.

Edit an Instrument Tag from the Domain Explorer

This option enables you to edit individual instrument tags. If you want to edit the tags associated with a particular loop, use the **Loop Number Properties** option. You can edit individual instrument tags that you enter in the **Enter Tag Number** dialog box or select the required tags from the **Search results** data window in the **Find Tag** dialog box.

1. On the **Domain Explorer**, expand your current <plant> hierarchy to display the **Instruments** folder.
2. Double-click the **Instruments** folder to display the existing tag numbers.
3. Right-click the required tag, and from the shortcut menu select **Properties**.
4. On the **Tag Properties** dialog box enter the properties as required. For details on entering power supply data (not available if the selected **Tag Class** is electrical), see *Enter Power Supply Data for Panels and Instrument Tags* (on page 94).
5. Click **OK**.

NOTES

- Editing the properties of an existing tag does not affect its existing association with a loop. For more details, see *Change an Instrument Tag Loop Association in the Domain Explorer* (on page 107).
- The data that appears in the **Prefix**, **Number**, and **Suffix** fields is derived from the tag number itself.
- You can also edit the properties of an instrument tag from the Instrument Index module. For more details see, *Edit Instrument Tags from the Instrument Index* (on page 93).

Edit Instrument Tags from the Instrument Index

This option enables you to edit single and multiple instrument tags. If you want to edit the instrument tag associated with a particular loop, use the Loop Number Properties option. You can edit individual tags that you enter in the **Enter Tag Number** dialog box or select the required tags from the **Search results** data window in the **Find Tag** dialog box.

1. To start the Instrument Index module do one of the following:
 - Click .
 - Click **Modules > Instrument Index**.
2. Do one of the following:
 - Click .
 - Click **Edit > Tag Numbers > Tag Number Properties**.
3. On the **Enter Tag Number** dialog box, do one of the following:
 - To edit a single tag, type the tag number in the box.
 - To edit multiple tags, click **Find** to open the **Find Tag** dialog box. Click and select the tags to be edited.
4. Click **OK**.
5. On the **Tag Properties** dialog box enter the properties as required. For details on entering power supply data (not available if the selected **Tag Class** is electrical), see *Enter Power Supply Data for Panels and Instrument Tags* (on page 94).
6. After modifying the data, do one of the following:
 - For multiple tags, click **Apply > Next** to continue editing. Click **OK** when you have finished editing.
 - For a single tag click **OK**.

NOTES

- Editing the properties of an existing instrument tag does not affect its existing association with a loop. For more details, see *Change a Tag Loop Association* (see "Change an Instrument Tag Loop Association in the Domain Explorer" on page 107).
- The data that appears in the **Prefix**, **Number**, and **Suffix** fields is derived from the instrument tag itself.

Customize Tag Name

These options allow you to customize the default tag number name template that appears in the **New Tag Number** dialog box.

Define new tag name template — These options determine how SmartPlant Instrumentation displays new tag number names in the **New Tag Number** dialog box in relation to the previously created tag number. The options are:

- **No default** — The data field in the **New Tag Number** dialog box will not display any default tag, letting you enter the number you need.
- **Same as the last created tag** — The data field in the **New Tag Number** dialog box displays the last created tag. You can accept the displayed number, modify it, or enter the number you need.

- **Same as the last created tag + 1** — The data field in the **New Tag Number** dialog box displays the last created tag plus 1 (one). You can accept the displayed number, modify it, or enter the number you need. This option is available for numeric tag names only. If your tag number names are not numeric, the data field in the **New Tag Number** dialog box will display the last created tag.

Ignore loop creation when creating new virtual tag — Allows you to create a virtual tag without being prompted to create a loop associated with the new virtual tag.

Use loop suffix in tag number name — Allows you to include the loop suffix in the name of a newly-created tag number.

NOTE In order to trim extra spaces in a tag name, enable the **Trim Instrument Tag Names** rule. In SmartPlant Instrumentation Rule Manager, expand the **Instrument Index > Consistency** hierarchy. Double-click the **Trim Instrument Tag Names** rule and then clear the **Disable rule** check box on the **General** tab of the **Rule Properties** dialog box. Note that this rule is provided to you as part of the shipped data.

Change the Tag Class of an Instrument

This procedure explains how to change the tag class of an existing instrument.

1. In the **Domain Explorer**, right-click an appropriate instrument.
2. On the shortcut menu, click **Properties**.
3. On the **Tag Number Properties** dialog box, click the ellipsis button  next to the **Number** box.
4. On the **Rename Tag Number** dialog box, select the tag class that you require.

Enter Power Supply Data for Panels and Instrument Tags

This procedure explains how to enter power supply data for various panels that require power supply. Although power supply data is not essential for SmartPlant Instrumentation functionality, it is indicated for the interface with the SmartPlant Electrical application. SmartPlant Instrumentation allows you to enter power supply data in all panels except for junction boxes and device panels.

1. Do one of the following to open the **Properties** dialog box of a panel or tag number:
 - In the **Domain Explorer** or **Reference Explorer**, right-click a desired panel and then click **Properties**.
 - In the **Domain Explorer** or **Reference Explorer**, right-click a desired instrument and then click **Properties**.
2. On the **General** tab, select the **Requires power supply** check box.
3. Click the **Power Supply** tab.
4. Under **Criticality**, select the criticality, which is used in SmartPlant Electrical to determine whether the current instrument requires UPS power or regular power.
5. Under **Rated voltage**, select a value that indicates the voltage at which the instrument is designed to operate.
6. If the instrument is running on alternating current, under **Power supply type** click **AC** and do the following:
 - a. Under **Frequency**, select the operating frequency of the instrument.
 - b. Under **Number of phases**, select the number of phases in the power supply to the instrument.
 - c. Under **Power factor full load**, enter a value between 0 and 1 for the ratio of active to apparent power at 100% of the rated power.

7. If the instrument runs on direct current, under **Power supply type**, click **DC**.
8. Under **Rated active load**, type the full load power consumption in kilowatts.
9. Type the following values in amperes:
 - a. Full load current.
 - b. Starting current.
10. In the **Coincidence factors** group box, do one of the following:
 - Under **Operating mode**, select **Continuous**, and under **X — continuous**, type a value between 0 and 1.
 - Under **Operating mode**, select **Intermittent**, and under **Y — intermittent**, type a value between 0 and 1.
 - Under **Operating mode**, select **Spare**, and under **ZZ — spare**, type a value between 0 and 1.
 - Under **Operating mode**, select **Standby**, and under **Z — stand by**, type a value between 0 and 1.

NOTE The fields under **Power distribution board data** group box display data that is determined within SmartPlant Electrical. On the **Power Supply** tab, click **Help** for more information.

Enter an Instrument Tag Remark

You use this option to enter a short remark to instrument tag properties in the Instrument Index Standard Browser view. You add your tag remarks in the **Rem** column. The browser view displays  in the **Rem** column for the tags that contain remarks.

1. On the main menu bar, click .
2. On the **Browser Manager** window, expand the **Instrument Index** on the Browser Groups pane and select Instrument Index Standard Browser group.
3. Ensure that the **Rem.** column is selected for displaying in the browser view by doing the following:
 - a. Expand the Instrument Index Standard Browser group, and click .
 - b. Under **Style** settings, click **Edit**.
 - c. Scroll down the **Data Field Header** column to the **Rem.** field header and select the **View** check box.
 - d. Click **Save**.
4. Close the **Browser Manager** window.
5. From the Instrument Index module, open the browser view, select the instrument tag that you require, and do one of the following:
 - Double-click the **Rem.** field.
 - Click .
 - Click **Actions > Remarks**.
 - On the selected tag, right-click and on the shortcut menu click **Tag Number Activities > Remarks**.
6. On the **Remarks** dialog box, type the required text in the fields provided.
7. On the **Notes** box, type a short note if needed.

TIP The text that you type in the **Notes** box also appears in the **Tag Number Notes** dialog box.

NOTE If necessary, define a custom browser view that you want to use for displaying the remarks. For details, see *Define a Standard Browser View for the Instrument Index* (on page 123).

Duplicate an Instrument Tag in the Domain Explorer

This option enables you to create a new instrument tag in the **Domain Explorer** by duplicating the properties of an existing one and then editing the new tag properties as required. You can create the new duplicated instrument tag in the same <unit> as the original tag or any other <unit> in the current domain.

1. On the **Domain Explorer**, expand your current <plant> hierarchy to display the **Instruments** folder of the <unit> you are working on.
2. Double-click the **Instruments** folder to display the existing instrument tags.
3. Right-click the instrument tag you want to duplicate, and on the shortcut menu click **Duplicate**.
4. Type the new instrument tag on the **Duplicated Tag Number** dialog box, and then click **OK**.
5. If you want to duplicate the instrument tag in another <unit> of the same domain, do the following:
 - a. Select the **Create in another unit** check box.
 - b. Click **OK**.
6. The **Select Target <Unit>** dialog box opens, select the target <unit> for the new tag, and then, click **OK**.
7. On the **Select Instrument Type** dialog box, select the instrument you want to associate with the current tag number, and then, click **OK**.
8. On the **Loop Name** dialog box, do one of the following:
 - Type the loop number that you want to associate the new instrument tag with, click **OK**, and then on the **Loop Properties** dialog box, enter the desired data and click **OK**.
 - Click **OK** to accept the displayed loop number and then on the **Loop Properties** dialog box, enter the desired data and click **OK**.
 - Click **Cancel** not to associate the new instrument tag with any loop. You can associate the new tag with a loop later. For more details, see *Change an Instrument Tag Loop Association in the Domain Explorer* (on page 107).
9. On the **Tag Properties** dialog box enter the required data or select the appropriate values from the lists. For details about entering power supply data (not applicable to electrical tags), see *Enter Power Supply Data for Panels and Instrument Tags* (on page 94).
10. Click **OK**.

TIPS

- You can also duplicate an instrument tag from the **Instrument Index** module. For more details, see *Duplicate an Instrument Tag in the Instrument Index* (on page 97).
- The software does not duplicate existing calibration settings of the source tag. If you want to define calibration settings for the duplicated tag, the calibration profile definitions apply. These definitions exist at the level of the instrument type.
- The software does not duplicate associated downstream lines, i.e., if more than one line is associated with the tag, only the first (upstream) line is duplicated.

Duplicate an Instrument Tag in the Instrument Index

This option enables you to create a new instrument tag in the Instrument Index module by duplicating the properties of an existing one and then editing the new tag properties as required. You can create the new duplicated instrument tag in the same <unit> as the original tag or any other <unit> in the current domain.

1. In the **Instrument Index Module** window, do one of the following:
 - Click .
 - Click **Edit > Tag Numbers > Duplicate Tag Number**.
2. On the **Enter Tag Number** dialog box, type the instrument tag number you want to duplicate, and then click **OK**.
3. To find a tag that you want to duplicate do the following:
 - a. On the **Enter Tag Number** dialog box, click **Find**.
 - b. On the **Find Tag** dialog box, click **Find**.
 - c. Select the instrument tag you want to duplicate, and then click **OK**.
4. Type the new instrument tag on the **Duplicated Tag Number** dialog box, and then click **OK**.
5. If you want to duplicate the instrument tag in another <unit> of the same domain, do the following:
 - a. Select the **Create in another unit** check box.
 - b. Click **OK**.
6. On the **Select Target <Unit>** dialog box, select the target <unit> for the new tag and then click **OK**.
7. On the **Select Instrument Type** dialog box, select the instrument type you want to associate with the current tag number, and then, click **OK**.
8. On the **Loop Name** dialog box, and do one of the following:
 - Type the loop number that you want to associate the new instrument tag with, and click **OK**.
 - On the **Loop Properties** dialog box, type the desired data and click **OK**.
 - Click **OK**, to accept the displayed loop number.
 - Click **Cancel**, not to associate the new instrument tag with any loop. You can associate the new tag with a loop later. For more details, see *Change a Tag Loop Association* (see "Change an Instrument Tag Loop Association in the Domain Explorer" on page 107).
9. On the **Tag Properties** dialog box enter the desired data or select appropriate values from the lists. For details on entering power supply data (not applicable for electrical tags), see *Enter Power Supply Data for Panels and Instrument Tags* (on page 94).
10. Click **OK**.

TIPS

- You can also duplicate an instrument tag from the **Domain Explorer**. For more details, see *Duplicate an Instrument Tag in the Domain Explorer* (on page 96)
- The software does not duplicate existing calibration settings of the source tag. If you want to define calibration settings for the duplicated tag, the calibration profile definitions apply. These definitions exist at the level of the instrument type.
- The software does not duplicate associated downstream lines, i.e., if more than one line is associated with the tag, only the first (upstream) line is duplicated.

Delete Instrument Tags

This option enables you to delete one or more instrument tags that are no longer in use.

1. In the **Domain Explorer**, click the **Instruments** folder of the <unit> you are working on.
2. On the **Items** pane, select the items you want to delete.
3. Right-click the selected items, and click **Delete**.
4. When prompted, click **Yes** to confirm deletion.

Delete Instrument Tags in the Instrument Index Module

1. On the Instrument Index module menu bar, click **Edit > Tag Numbers > Delete Tag Numbers**.
2. On the **Enter Tag Number** dialog box, type the instrument tag number you want to delete, or click **Find** to select one or more instrument tags.
3. On the **Find Tag** dialog box, click **Find** and select the instrument tags you want to delete.
4. Click **OK**.
5. When prompted, click **Yes** to confirm deletion.

Delete Instrument Tags in the Browse Window

This option allows you to delete more than one instrument tag at the same time in batch mode.

1. In the Instrument Index module, open the Instrument Index Standard Browser view by doing one of the following:
 - Click **Actions > Browse Index**.
 - Click 
2. On the **Browser View** window, select the instrument tags you want to delete.
3. Do one of the following:
 - On the lower toolbar, click .
 - Right-click the selected Instrument tags, and on the shortcut menu click **Tag Number Activities > Delete Tag number**.
 - Click **Actions > Delete Tag Number**.
4. When prompted, click **Yes** to confirm deletion.

Move an Instrument Tag to Another Plant Group

This option allows you to move an instrument tag to another <unit> in the same <plant> or to a <unit> in a different <plant> in the domain.

1. On the Instrument Index module menu bar, click **Edit > Tag Numbers > Move Tag Number**.
2. On the **Enter Tag Number** dialog box, type the instrument tag number you want to duplicate, and then click **OK**.
3. To find a tag that you want to duplicate do the following:
 - a. On the **Enter Tag Number** dialog box, click **Find**.
 - b. On the **Find Tag** dialog box, click **Find**.
 - c. Select the instrument tag you want to duplicate, and then click **OK**.
4. On the **Select Target** dialog box, select the <unit> to which you want to move the current tag.
5. Click **OK**.

NOTE If you move an instrument tag to a target <unit> whose tag naming conventions are different from the naming conventions of the <unit> where the source tag is, the software applies the target <unit> naming conventions to the duplicated tag number.

Move Multiple Instrument Tags in the Browser Window

This option allows you to move one or more instrument tags in the **Browser View** window. You can move a tag to another <unit> in the same <plant> or to a <unit> in a different <plant> in the domain.

1. Open the Instrument Index module, by doing one of the following:
 - Click **Modules > Instrument Index**.
 - Click 
2. Open an Instrument Index Standard Browser view, by doing one of the following:
 - Click **Actions > Browse Index**.
 - Click 
3. Select the instrument tags you want to move.
4. Do one of the following:
 - Click **Actions > Move Tag Number**.
 - Right-click the selected tags, and from the shortcut menu click **Tag Number Activities > Move tag Number**.
5. On the **Select Target <Unit>** dialog box, select the <unit> you want to move the instrument tags to.
6. Click **OK**.

NOTE If you move an instrument tag to a target <unit> whose tag naming conventions are different from the naming conventions of the <unit> where the source tag is, the software applies the target <unit> naming conventions to the duplicated tag number.

Rename an Instrument Tag

1. From the Instrument index module, do one of the following:
 - Click **Edit > Tag Numbers > Tag Number Properties**.
 - Click 
2. On the **Enter Tag Number** dialog box, do one of the following:
 - Type the tag number you want to rename.
 - Click **Find**, to open the **Find Tag** dialog box. In the **Find Tag** dialog box, click **Find** and select the tags you want to rename.
3. If needed, on the **Tag Number Properties** dialog box, change the instrument type of the tag you want to rename.
4. If you want to update the numbers of the documents associated with the current instrument tag (specification, process data, calculation, and dimensional data sheets), select the **Update document numbers** check box.

IMPORTANT Make sure that the document number naming conventions includes instrument naming convention segments the current tag contains. The software does not update document numbers for which the default naming convention is used. Suppose you want to rename a tag number **FT-100** to **FT-101** and the source tag has a spec **FT-100-SP**. After renaming, the default document number of the renamed instrument specification remains as **FT-100-SP**, even though this number contains the **100** segment, which was renamed for the instrument.

5. Beside to the **Number** field, click .
6. On the **Rename Tag Number** dialog box, change the tag class, edit the tag instrument type, number, or suffix as required.
7. Click **OK**.
8. If the instrument type acronym is not unique, select the required instrument type from the **Select Instrument Type** dialog box and click **OK** to open the **Tag Number Renaming Options** dialog box.
9. If you want to rename the associated control system tags, do the following:
 - a. Select the **Rename CS** tag check box.
 - b. In the **New Control System Tag** data field, modify the control system tag name as required.
 - c. Click **OK**.
10. Click **OK**, to close the **Tag Number Properties** dialog box.

NOTES

- If you have connected several CS tags to the current tag number, the system automatically assigns the same new name to all the CS tags. You must rename the new CS tags manually to make the names unique.
- Before clicking **OK**, note that all the wiring items that were associated with the old CS tag will be renamed according to the new control system tag name, and the associated specification will be deleted. Verify whether the appropriate loop blocks and hook-ups are associated with the new tag number.
- Make sure that the new name complies with the naming conventions for the current <unit>. Naming conventions do not apply to tags classed as electrical. For more details, see *Instrument Tag Naming Convention* (on page 89).
- For more information about instrument tag renaming options, see *Instrument Tag Renaming Options* (on page 100).

Instrument Tag Renaming Options

When you rename a tag, two situations are possible for changing the process function and the instrument type of that tag:

- **The Process Function has not changed** — for example: renaming 108-PT-2212 to 108-PI-2212. Renaming a tag number this way does not change the process which the tag describes. Therefore, all the process data information that has been associated with the old tag will be automatically associated with the new tag. You can also delete the old process data if required.

- **The Process Function has changed** — for example: renaming 108-PT-2212 to 108-FT-2212. If you rename a tag number this way, only general process data properties, such as pressure, temperature, and density will be propagated from the old tag number to the new one. Process data properties specifically associated with the tag's process function, for example, range, alarm trip settings, upper level, and so forth, will either not be propagated to the renamed tag or only be propagated partially. In this case, the old tag's additional properties and calculation results will not propagate to the new tag either.

Changing the Measured Variable

You can change the measured variable of the new loop number or keep it the same as the source one. New tag numbers associated with the new loop number will be affected accordingly, that is, the measured variable of the new tag numbers will change if the measured variable of the new duplicated loop is changed. For example, if you are duplicating Loop **101-F-102** and you change the measured variable of the new loop to **T**, the new tag numbers associated with the new loop number will take a new instrument type in accordance with the new measured variable: source Tag Number **101-FE-102** will change to **101- TE-102**.

Change an Instrument Type

This option allows you to change the instrument type and process function of an instrument tag. You make this change when editing instrument tag number, this can be done in single or multi-mode.

1. Open the **Tag Number Properties** dialog box.
2. On the **Tag Number Properties** dialog box, do one of the following:
 - From the **Instrument type** list, select the instrument type that you require.
 - Click  to open the **Instrument Type** dialog box, where you can modify the existing instrument types or add a new instrument type to the list.
3. On the **Tag Number Properties** dialog box, click **Apply**.

TIP Instead of clicking **Apply**, you can click **Rename** to rename the current tag number as required.
4. If the selected instrument type belongs to a different process function, in the **Tag Number Renaming Options** dialog box do one of the following:
 - Select **Keep general process data** to delete only specific process data associated with the tag whose instrument type you are changing.
 - Select **Delete process data** to delete all the process data associated with the tag whose instrument type you are changing.
5. If you want to rename the associated control system tags, do the following:
 - a. Select the **Rename CS tag** check box.
 - b. On the **New Control System Tag** data field, modify the control system tag name as required.
 - c. Click **OK**, to return to the **Tag Number Properties** dialog box.
6. On the **Tag Number Properties** dialog box, click **OK**.

NOTES

- If you have connected several CS tags to the current tag number, the system automatically assigns the same new name to all the CS tags. You must rename the new CS tags manually to make the names unique.

- Before clicking **OK**, note that all the wiring items that were associated with the old CS tag will be renamed according to the new control system tag name, and the associated specification will be deleted. Verify whether the appropriate loop blocks and hook-ups are associated with the new tag number.

Associating Tag Category and Criticality

You can associate a selected instrument with several tag categories and one instrument criticality. You can also associate instruments that require preventive maintenance with either Process Safety Systems or Quality Systems. For example, if an instrument is used for custody purposes, it can be defined as a Quality System.

Add and Edit Criticality Values

This option allows you to create and customize instrument criticality values that appear on the **Criticality** list in the **Associate Categories and Criticality** dialog box. Tag criticality is a user-defined process classification of instruments, for example **process safety system**, **environmentally vital system**, **quality system**, and so forth. Tag categories help you select groups of tags when performing Maintenance module procedures.

1. To open the **Criticality Values** dialog box, do one of the following:
 - On the **Instrument Index Module** window menu bar, click **Tables > Instrument Criticality**.
 - On the **Instrument Index Standard Browser** view, right-click a tag number and on the shortcut menu, click **Tag Number Activities > Associate Categories and Criticality**. Then, in the **Associate Categories and Criticality** dialog box, click  beside the **Criticality** list arrow.
2. In the **Instrument Criticality** dialog box, do one of the following:
 - Click **New** to append a new row to list of existing options and type a criticality name and description.
 - Highlight a row and edit the **Criticality** and **Description** fields.
 - Highlight a row and click **Delete** to delete this criticality option.
3. Click **OK** to save the settings and close the dialog box.

NOTES

- If the criticality list is long, start typing a criticality name in the **Find criticality** box. In the data window, SmartPlant Instrumentation highlights the required name as you type.
- After you delete a row, the criticality dissociates from all tags for which it was defined. The criticality option will no longer be available in the **Associate Categories** dialog box.

Add and Edit Instrument Tag Categories

This option enables you to edit the name and the description of the available instrument tag categories. Using this option, you can also add new categories which you will be able to associate with instrument tags.

1. Open an Instrument Index Standard Browser view.
2. Click **Actions > Tag Categories**.
3. Click **New** to add a new tag category row.
4. Type the desired tag category name and description.
5. To edit an existing tag category, double-click a field and type the new value.
6. To delete an existing tag category:
 - a. Select a tag category in the data window.
 - b. Click **Delete** to delete the highlighted category.

- c. When prompted, click **Yes** to confirm the deletion, or click **No** to keep the selected category.
7. Click **OK** to save the changes you made to the tag categories.

Associate Tag Category and Criticality

1. Open an Instrument Index Standard Browser view.
2. In the browser view, right-click an instrument, and on the shortcut menu, click **Tag Number Activities > Associate Categories and Criticality**.
TIP You must select a single tag (not multiple tags) to associate tag categories and criticality.
3. To associate the desired categories with the selected tag, do one of the following:
 - Drag a category from the **Unassociated Categories** pane to the **Associated Categories** pane.
 - Select a category under the **Unassociated Categories** pane and click .**TIP** You can associate the selected tag number with as many categories as you desire. For details of how to add new categories, see *Add and Edit Instrument Tag Categories* (on page 103).
4. From the **Criticality** list, select a value to associate the current instrument with a criticality setting.
5. Select the **Quality System (ISO)** check box to associate the currently selected tag with an ISO quality system.

Generate a Process Data Sheet in a Browser Window

Use this option to generate a process data sheet for a selected instrument in an Instrument Index Standard Browser view, where a process data sheet was not previously defined for the instrument.

1. In the browser view, select the tag numbers that you require.
2. Do one of the following:
 - Right-click, and on the shortcut menu, click **Generate Process Data Sheet**.
 - Click, **Actions > Generate Process Data Sheet**.
3. In the **Results** dialog box, view the process data sheet creation results, and then click **Close**.

Incorporating Soft Tags Within an Enhanced Loop Drawing

The Enhanced Report Utility allows you to generate loop drawings for loops that include soft tags. For example, a loop that contains an air-conditioning system with temperature gauges, lines, engines, compressors, and so forth. The temperature gauges send signals to a DCS panel and from there to a computer. A software code that functions as a thermostat, interprets the signal and sends a command to start the engine. The compressor, connected to the engine, compresses more gas through the lines to lower the room temperature (closed loop).

To generate an Enhanced Report Utility drawing that includes a soft tag you need to create a symbol representing the tag using the Symbol Editor. Then you associate the symbol with the tag in SmartPlant instrumentation, associate the tag with a loop and generate the appropriate drawing.

Flow of Activities for Managing Soft Tags

The following flow of activities allows you to create soft tags their related instrument type, associate soft tags with loops, generate a loop drawing in Enhanced Report utility, and edit the drawing to display the soft tags properly.

1. In the **Domain Explorer**, create a new loop or select an existing one, see *Create a New Individual Loop Number* (on page 71).
2. In the Symbol Editor create a symbol with a macro. For details, see *Create a Custom Symbol and Add a Macro to a Symbol* in the Symbol Editor help. You will later associate this symbol with a soft tag.
3. Define a new instrument type for soft tags for example, **ST**. For details, see *Define Instrument Type* (see "Define an Instrument Type" on page 83).
4. Create a new soft tag. For details, see *Create an Instrument in the Domain Explorer* (on page 90).
5. Set the new soft tag instrument type to **ST**. For details, see Instrument Type Common Tasks.
6. To associate the custom symbol with the soft tag do one of the following:
 - Associate the custom symbol with the tag instrument type, see *Set a Default Custom Symbol for Items Associated with an Instrument Type* (on page 105).
 - Associate a custom symbol with the specific soft tag.
7. Set the loop generation method to **Custom By Loop** or **Custom by Signal** to allow the software to use custom symbols when generating an Enhanced Report Utility drawing, see Loop Drawing Generation Method.
8. Generate an Enhanced Report Utility drawing for this loop, see *Generate a Report Using the Domain Explorer* (see "Generate a Report for an Instrument" on page 542).
9. In the Enhanced Report Utility environment, press F7 to open the **Domain explorer**.
10. Find the loop in the **Domain Explorer**, see *Find an Item in the Domain Explorer* (see "Find an Item in the Tree View of an Explorer Window" on page 543).
11. Drag the soft tag from the **Domain explorer** to the drawing.

TIPS

- The selected tag can also be from a different loop.
 - The software automatically saves the position of the tag after you place it.
12. Connect the soft tag to a conventional loop tag, see *SmartPlant Instrumentation Enhanced Report Utility User's Guide* > Attach Redlining to Drawing Items.
 13. Click **File** > **Save Custom Changes**.

Set a Default Custom Symbol for Items Associated with an Instrument Type

1. On the Instrument Index module menu bar, click **Tables** > **Instrument Types**.
2. On the **Instrument Type** dialog box, click **Profile**.
3. In the **General** tab, on the **Enhanced Report Utility Symbol** group box, in the **Symbol file name and path** data field, type the appropriate symbol path (or browse to find it), and Click **OK**.

SECTION 7

Associating Instrument Tags with Loop Numbers

This section shows you how to associate instrument tags with loops. There are several different ways that you can associate an instrument tag with a loop. You can select a particular loop number and make a batch instrument tag association or dissociate any tags from the selected loop as needed. Another way is to select an instrument tag and change its loop association if it exists. You can also create a new loop with which you want to associate a selected instrument tag and associate it with this loop on the fly.

Associate Multiple Tag Numbers with a Loop

This option shows you how to select an existing loop number and associate it with the required instrument tag. You make the association using the **Associate Tag Number** dialog box which displays the selected loop numbers and all the tags that are already associated with it. You can also associate numerous instrument tags with the selected loop.

1. Start the Instrument Index module.
2. Do one of the following:
 - Click **Actions > Associate**.
 - Click .
3. On the **Enter Loop Number** dialog box, do one of the following:
 - Type the name of the required loop number on the **Enter Loop Number** data field, and click **OK**.
 - Click **Find**, to open the **Find Loop** dialog box. Search for a desired loop, select it, and then click **OK**.
4. On the **Associate Tag Number** dialog box, click **Find** to open the **Find Tag** dialog box.
5. On the **Find Tag** dialog box, click **Find** and select the tag numbers that you want to associate with the current loop.
6. Click **OK**.
7. On the **Associate Tag Number** dialog box, under **Available tag numbers**, select a tag number and click **Associate**. Repeat this step for every tag number that you want to associate with the current loop.
8. Click **OK**, to make the association.

Change an Instrument Tag Loop Association in the Domain Explorer

This option shows you how to move a selected instrument tag that is associated with a specific loop number to another existing loop number. You change this association when editing an instrument tag.

1. In the **Domain Explorer**, expand your current <plant> hierarchy to display the **Instruments** folder.
2. Double-click the **Instruments** folder to display the existing tag numbers.
3. Right-click the required tag, and from the shortcut menu select **Properties**.
4. On the **Tag Number Properties** dialog box, click **Associate**.
5. On the **Find Loop** dialog box, type the required search parameters as needed and click **Find**.

6. Select the loop you require in the **Search results** data window and click **OK**.
7. On the **Tag Number Properties** dialog box, click **OK**.

Change Instrument Tag Loop Associations in the Instrument Index Standard Browser View

This option shows you how to move multiple instrument tags that are associated with a specific loop number to another existing loop number. You change this association when editing an instrument tag.

1. To start the Instrument Index module do one of the following:
 - Click .
 - Click **Modules > Instrument Index**.
2. Do one of the following:
 - Click .
 - Click **Edit > Tag Numbers > Tag Number Properties**.
3. On the **Enter Tag Number** dialog box, do one of the following:
 - To choose a single tag, type the tag number in the box.
 - To choose multiple tags, click **Find** to open the **Find Tag** dialog box, and then click and select the desired tags.
4. Click **OK**, to open the **Tag Number Properties** box.
5. Click **Associate**.
6. On the **Find Loop** dialog box, type the desired search parameters as needed and click **Find**.
7. Select the loop you require in the **Search results** data window and click **OK**.
8. If you chose one instrument tag, on the **Tag Number Properties** dialog box, click **OK**.
9. If you chose more than one instrument tag, on the **Tag Number Properties** dialog box:
 - a. Click **Apply** to save the changes.
 - b. Click **Next** to find the next tag.
 - c. Click **Associate** to associate a tag with a loop.
 - d. Click **OK** to finish.

Associate an Instrument Tag with a New Loop

This option shows you how to create a new loop number on the fly while editing an instrument tag. You can then move the current instrument tag and associate it with the new loop you created.

1. On the **Domain Explorer**, expand your current <plant> hierarchy to display the **Instruments** folder.
2. Double-click the **Instruments** folder to display the existing tag numbers.
3. Right-click the required tag, and from the shortcut menu select **Properties**.
4. On the **Tag Number Properties** dialog box, click **New Loop**.
5. On the **New Loop Number** dialog box, type the new loop number and click **OK**.
6. Edit the properties of the new loop number on the **New Loop Number** dialog box and click **OK**.
7. On the **Tag Number Properties** dialog box, click **Associate**.
8. On the **Find Loop** dialog box, type the required search parameters as needed and click **Find**.

9. Select the loop you have just created in the **Search results** data window and click **OK**.
10. On the **Tag Number Properties** dialog box, click **OK**.

Dissociate an Instrument Tag from Loops

This option shows you how to dissociate instrument tags from a selected loop.

1. Start the Instrument Index module.
2. Do one of the following:
 - Click **Actions > Associate**.
 - Click .
3. On the **Enter Loop Number** dialog box, do one of the following:
 - Type the name of the required loop number on the **Enter Loop Number** data field, and click **OK**.
 - Click **Find** to open the **Find Loop** dialog box. Search for a desired loop, select it, and then click **OK**.
4. On the **Associate Tag Number** dialog box, under **Associated Tags** select the tag number you want to dissociate from the current loop.
5. Click **Dissociate**. Repeat steps four and five for every tag number that you want to associate with the current loop.
6. When you have finished, Click **OK**.

Associate Tag Numbers Dialog Box

This dialog box enables you to make associations between tags and loops. You can associate existing tags and/or newly created tags with a selected loop number.

Loop number — Displays the selected loop.

Available tag numbers — Lists the tags that have been selected for association with the current loop. To add tags to this list, click **Find**. Highlight a tag and click **Associate**. The software makes the association after you click **OK**.

Associated tag numbers — Lists the tag numbers that are already associated with the current loop.

Associate — Associates the tags you selected in the **Available tag numbers** pane. The software moves the selected tags to the **Associated tag numbers** pane and makes the association with the current loop after you click **OK**.

Dissociate — Dissociate the tags you selected in the **Associated tag numbers** pane. The software moves the selected tags to the **Available tag numbers** pane and dissociates them from the current loop after you click **OK**.

Find — Open the **Find Tag** dialog box, where you can find the required tags to be associated with the current loop. The software displays the tags that you find in the **Available tag numbers** pane and makes them available for association.

SECTION 8

Working with Typical Loops and Tags

A typical loop is a combination of user-defined loop properties that you can use as a template for creating loops and tags in batch mode. These properties include a loop measured variable, loop type, loop function and so forth. This template must contain at least one typical tag.

A typical tag is a virtual tag that is used for the creation of instrument tag numbers in your plant. Each typical tag must be associated with a specific instrument type and description. Furthermore, you can set instrument tag number properties for a virtual tag. For example, you can define service, location, I/O type, and so forth. You must define at least one typical tag for each typical loop you create.

You can create as many typical loops as required and use them to create loops in batch mode. Typical loops with associated typical tags can be very useful when you need to create numerous loops based on the same loop template.

You can view all the typical loops you have created in the current domain. The list of typical loops is automatically updated after you create a new typical loop, or if you edit or duplicate existing loops.

Create a Typical Loop

This procedure shows you how to create a new typical loop and the associated tag. Typical loops with associated typical tags can be very useful when you need to create numerous loops based on the same loop template.

Creating a new typical loop is the first stage in batch loop creation procedure. This is when you make all the required typical loop definitions including the typical loop name, measured variable, and so forth. At this stage, you also select the appropriate instrument types for the typical tags you associate with this typical loop.

1. Start the Instrument Index module.
2. On the Instrument Index menu bar, click **Edit > Typical Loop Management**.
3. On the **Typical Loop Management** dialog box, click **New**.
4. On the **Typical Loop Properties (New)** dialog box, in the **Loop name** field, type a unique name for the new typical loop.
5. In the **Loop service** field, type an appropriate loop service if needed.
6. In the **Loop suffix** field, type a suffix if required.
TIP Use a suffix if you want to have numerous typical loops with the same names. This is useful when you have numerous typical loops that perform the same or similar function.
7. From the **Measured variable** list, select the required measured variable for the new typical loop. If the required value is not available, click  next to the list arrow to open the **Loop Measured Variables** dialog box where you can add a new loop process variable identifier or edit an existing one.
8. From the **Loop type** list, select the required loop type for the new typical loop. If the required value is not available, click  next to the list arrow to open the **Loop Types** dialog box where you can add a new loop type or edit an existing one.
9. From the **Loop function** list, select the required loop function for the new typical loop. If the required value is not available, click  next to the list arrow to open the **Loop Functions** dialog box where you can add a new loop function identifier or edit an existing one.

10. In the **Note** field, type a short note if needed.
11. Select the **Apply service to tags** check box, to propagate the loop service you entered for this typical loop to all typical tags that are associated with it.
12. Click **Add**, to append a new typical tag row in the **Associated typical tags** data window.
13. In the data window, do the following:
 - a. From the **Instrument Type** list, select the instrument type that you require.
 - b. In the **Number** field, type the required typical tag number.
 - c. In the **Suffix** field, enter the required typical tag suffix to ensure tag name uniqueness.
 - d. Click **Add**, to add as many typical tags as required, and then click **OK**, to create the typical loop with the associated tags.

TIP On clicking **OK**, you are prompted to edit the newly-created typical tag.

NOTES

- Typical tags do not have any profile data associated with the instrument type that you specify for typical tags. However, if you set your preferences for tag creation to the profile options, the SmartPlant Instrumentation creates the new tag numbers based on the instrument type profiles defined for the typical tags that are associated with the current typical loop.
- Make sure that you define the instrument type profiles prior to creating a typical loop.
- SmartPlant Instrumentation allows you to select instrument types from the Conventional, Fieldbus, Hart, Profibus DP, Profibus PA, and Hart tag classes.
- Ensure that the typical tag naming conventions comply with the required naming convention rules. For more details, see *Typical Tag Naming Conventions* (on page 117).
- The **New Tag Name** field automatically displays the name of the new typical tag after defining the typical tag instrument type, number, and suffix.

Duplicate a Typical Loop

This option enables you to duplicate an existing typical loop. Duplicating a typical loop involves defining a new typical loop name and new typical tag names to ensure name uniqueness.

1. Start the Instrument Index module.
2. Click **Edit > Typical Loop Management**.
3. Select a typical loop to duplicate.
4. On the **Typical Loop Management** dialog box, click **Duplicate**.

TIP The changes you make to the source typical loop affect the properties of the target typical loop only.
5. In the **Loop name** field, type a unique name for the new typical loop.
6. In the **Loop service** field, enter an appropriate loop service if required.
7. In the **Loop suffix** field, type a suffix if required.

TIP Use a suffix if you want to have numerous typical loops with the same names. This is useful when you have numerous typical loops that perform the same or similar function.
8. From the **Measured variable** list, select the required measured variable for the new typical loop. If the required value is not available, click  next to the list arrow to open the **Loop Measured Variables** dialog box where you can add a new loop process variable identifier or edit an existing one.
9. From the **Loop type** list, select the required loop type for the new typical loop. If the required value is not available, click  next to the list arrow to open the **Loop Types** dialog box where you can add a new loop type or edit an existing one.

10. From the **Loop function** list, select the required loop function for the new typical loop. If the required value is not available, click  next to the list arrow to open the **Loop Functions** dialog box where you can add a new loop function identifier or edit an existing one.
 11. In the **Note** field, type a short note if needed.
 12. Select the **Apply service to tags** check box, to propagate the loop service you entered for this typical loop to all typical tags that are associated with it.
 13. Click **Add**, to append a new typical tag row in the **Associated typical tags** data window.
 14. On the data window, do the following:
 - a. From the **Instrument Type** list, select the instrument type that you require. SmartPlant instrumentation retrieves profile data associated with this instrument type and applies this data to new tag numbers only when performing batch loop creation. For more details, see *Batch Loop Creation from Typical Loops* (on page 113).
 - b. On the **Number** field, type the required typical tag number.
 - c. On the **Suffix** field, enter the required typical tag suffix to ensure tag name uniqueness.
 - d. Click **Add**, to add as many typical tags as required, and then click **OK**, to create the typical loop with the associated tags.
- TIP** On clicking **OK**, you are prompted to edit the newly-created typical tag.

NOTES

- Ensure that the typical tag naming conventions comply with the required naming convention rules. For more details, see *Typical Tag Naming Conventions* (on page 117).
- The **New Tag Name** field automatically displays the name of the new typical tag after defining the typical tag instrument type, number, and suffix.

Batch Loop Creation from Typical Loops

This option shows you how to create numerous loop numbers based on existing typical loops. SmartPlant Instrumentation creates these loop numbers in batch mode. The software also lets you verify that the data you selected and entered will not stop the loop creation process. When creating numerous loop numbers based on existing typical loops, the software also creates new tag numbers and associates them with the newly created loops. The software creates these tag numbers according to your settings on the **Duplicate** page of the **Preferences** dialog box.

1. Start the Instrument Index module.
2. Click **Edit > Batch Loop Creation**.
3. On the **Batch Loop Creation** dialog box, select an existing typical loop from the **Typical Loop** list. SmartPlant Instrumentation will base the new loops on this typical loop.
4. To find a typical loop from a long list of typical loops, do the following:
 - a. Click **Find**.
 - b. In the **Find Typical Loop** dialog box, enter the required search parameters and click **Find**.
 - c. Select the required typical loop in the **Search results** data window and then click **OK**. The selected typical loop will automatically appear in the **Typical Loop** field of the **Batch Loop Creation** dialog box.

- d. In the **New Loop Numbers** field, enter the range of numbers for the new loops that will be created based on the selected typical loop.

TIPS

- You can create as many loops based on the selected typical loop as you require. To create more than one loop, simply enter the required new loop number names in the **New Loop Number** field. You can enter a range of loop names or a list as needed.
 - For noncontiguous alphanumeric or numeric loop numbers, type the loop numbers with commas between them. For a range of numeric loop numbers, type the range of loop numbers with a hyphen between them. For example, to create loops **1000, 1001, 1002, 1003, 1057, FT10, F11, and F12** type: **1000-1003, 1057, FT10, F11, F12**.
5. Click **Add** to add a new data row to create another set of loops. You can add as many sets of loops as you require for batch creation.
TIP You should verify the correctness of the data if you are creating a large number of loops. The creation process may stop if SmartPlant Instrumentation encounters a problem with one of the loops. To avoid this situation, click **Verify** to correct some possible data problems before you proceed with loop creation. For more details, see *Verify New Loop Numbers* (on page 114).
 6. Click **Create** to start the loop creation.
TIP If for some reason the loop creation process fails, the software displays an appropriate message informing you that a particular set in a specified row has not been created. Moreover, the **Done** check box for that row remains cleared.
 7. Click **Close**.

NOTE To avoid duplicate loop numbers in your <plant>, check which tag number numeric segments are available before starting batch loop creation. For more details, see *Create a List of Available Tags* (on page 134).

Verify New Loop Numbers

This option shows you how to verify new loop numbers that you want to create from typical loop numbers in batch mode, are correct and will not cause problems during their creation.

When creating numerous loops and tag numbers from typical loops in batch mode, some data problems might cut short the creation process. If, during batch loop creation, SmartPlant Instrumentation encounters a data problem with one loop, the creation process cannot proceed with the rest of the typical loops. To avoid this problem, SmartPlant Instrumentation helps you verify that you selected and entered data that will not stop the creation process.

SmartPlant Instrumentation verifies the following:

- Loop number uniqueness.
- Loop and instrument naming conventions.
- Loops and tags reserved for other projects.

The verification procedure takes much less time than the actual creation; therefore, you should do it before you start creating new loops and tag numbers.

1. In the **Batch Loop Creation** dialog box, select the required typical loops and enter the new loop numbers in the **Loop creation set** data window. For more details, see *Batch Loop Creation from Typical Loops* (on page 113).
2. Click **Verify**.
3. If a data problem is encountered, follow the instructions given by the software to correct the problem.

Edit a Typical Loop

This option enables you to edit the properties of an existing typical loop. You can modify the existing typical loop properties and associate new typical tags with the current loop.

1. On the Instrument Index menu bar, click **Edit > Typical Loop Management**.
2. On the **Typical Loop Management** dialog box, select the required typical loop and click **Properties**.
3. On the **Typical Loop Properties** dialog box, edit the fields as needed.
IMPORTANT The **Loop name** and the **Measured variable** fields are required fields.
4. On the **Associated typical tags** data window, select an existing typical tag that has been already associated with the current loop and do one of the following:
 - Click **Properties** to open the **Typical Tag Number Properties** dialog box to edit the typical tag properties. For more details, see *Edit a Typical Tag* (on page 116).
 - Click **Delete** to delete the selected tag.
5. Click **Add** to append a typical tag row in the **Associated typical tags** data window.
6. On the data window, do the following:
 - a. In the **Instrument Type** column, select the required instrument type from the list. The selected instrument type serves as a typical tag associated with the current typical loop.
 - b. In the **Number** field, type the required typical tag number.
 - c. In the **Suffix** field, type the required typical tag suffix to ensure tag name uniqueness.
 - d. Add as many typical tags as required and click **OK** to associate the newly added typical tags with the current loop.

NOTES

- Ensure that the typical tag naming conventions comply with the required naming convention rules. For more details, see *Typical Tag Naming Conventions* (on page 117).
- The **New Tag Name** field automatically displays the name of the new typical tag after defining the typical tag instrument type, number, and suffix.

Delete a Typical Loop

This option shows you how to delete the required typical loop with or without the associated typical tags.

1. On the Instrument Index menu bar, click **Edit > Typical Loop Management**.
2. On the **Typical Loop Management** dialog box, select the required typical loop and click **Delete**.
3. On the **Delete Typical Loop** dialog box, review the typical loop properties and click **Delete**.
4. If prompted, click **Yes** to delete the typical loop and associated tags. Click **No** to delete the typical loop only.
5. On the **Typical Loop Management** dialog box, click **Close**.

Edit a Typical Tag

This option shows you how to edit the properties of an existing typical tag, including renaming a typical tag if needed. You might want to edit the properties of the typical tags if you plan to perform batch loop creation according to specific tag data you define in the **Typical Tag Number Properties** dialog box. Depending on your preference options, when creating loops in batch mode, the software creates conventional tag numbers using the profile data of the source instrument type, or creates typical tags using specific source tag data you define in the **Typical Tag Number Properties** dialog box.

1. Start the Instrument Index module.
2. Do one of the following:
 - Click **Edit > Tag Numbers > Tag Numbers Properties**.
 - Click .
3. On the **Enter Tag Number** dialog box, Click **Find** to open the **Find Tag** dialog box.
4. On the **Find Tag** dialog box, from the **Tag class** list select **Typical**, enter the required search parameters if needed and click **Find**.
5. In the **Search results** data window, select the typical tag that you want to edit and click **OK**.
6. In the **Typical Tag Number Properties** dialog box, modify the typical tag properties as you require.
7. Click **OK**.

NOTE You can also edit a typical tag when editing a typical loop. For more details, see *Edit a Typical Loop* (on page 115).

Edit a Typical Tag in a Browser View

Use the following procedure to edit the properties of one or more typical tags in an Instrument Index Standard Browser view. You can select typical tags, edit the properties of each typical tag separately and associate these typical tags with other existing typical loops.

1. Open the Browser Manager by doing one of the following:
 - From an Instrument Index Standard Browser view, click .
 - Click .
 - Click **File > Browser Manager**.
2. Select the browser (**Instrument Index Standard Browser** or a PowerSoft Browser that supports tag number data, if available) that has the default view that you want to open.
3. Select the appropriate browser view.
4. Click **Edit**.
5. On the **View profile** display, from the **Display data at level** list, select **Typical**.
6. Click **Save**.
7. Open the browser view and use the **Shift** or **Ctrl** key to select the typical tags that you require.
8. Do one of the following:
 - Click **Edit > Properties**.
 - Click .
 - Right-click the selected tag numbers, on the shortcut menu, click **Tag Number Activities > Properties**.
9. In the **Typical Tag Number Properties** dialog box, edit the typical tag properties as required.

10. Click **Apply** > **Next**, to edit the next selected tag.
11. Click **OK**.

Typical Tag Naming Conventions

You can use any naming convention for your typical tags as long as it contains the typical tag number segment. The name segment of a typical tag can be the same length or shorter than the name segment of a tag. You defined tag name segments in the naming conventions for the current <unit>.

The naming conventions for typical tags are as follows:

- Instrument type — up to 4 characters in the **name** segment, (the typical tag **name** segment is automatically truncated to 4 characters when the instrument type name contains more than 4 characters).
- Typical tag number — up to 8 characters in the typical tag number segment.

Typical tag suffix — up to 3 characters in the typical tag suffix segment.

- Example of a typical tag name: **FT-FLOW_CTRLR/2**.

The naming convention for typical loops is as follows:

- Typical loop name — up to 50 characters. When using a loop suffix the maximum loop name length is shortened to 48 characters. The typical loop suffix can contain up to 3 characters. In addition, there must be a slash ("/") separator between the number and the suffix.

SECTION 9

Managing Lines

You can create, modify, and delete lines in the Instrument Index module. The **Lines** dialog box holds all the line data in your <plant>. Lines are categorized according to line types. You can create new line types and then add new lines to these types as required. You can also change the type of an existing line if needed and copy line data from a selected line to several target lines.

Create a New Line

This option shows you how to create a new line in the Instrument Index module.

1. Start the Instrument Index module.
2. To open the **Lines** dialog box, do one of the following:
 - Click **Tables > Lines**.
 - Open the **Tag Number Properties** dialog box, click  next to the **Line** list arrow.
3. On the **Line type** list, select the required line type.

TIP If the required line type does not exist, click  next to the **Line type** list arrow to open the **Line Types** and create a new line type. For more details, see *Create or Edit a Line Type* (on page 120).

4. Click **New** to open the **Line Properties** dialog box.
5. Define the line properties as you require and click **OK**.

Edit Line Data

This option shows you how to edit the data of an existing line. Line data comprises such properties as the line number, pipe material and standard, line size, its internal diameter, and wall thickness.

1. Start the Instrument Index module.
2. To open the **Lines** dialog box, do one of the following:
 - Click **Tables > Lines**.
 - Open the **Tag Number Properties** dialog box, click  next to the **Line** list arrow.
3. From the **Line type** list, select the required line type or select the **Show all line types** check box.
4. Select the required line in the data window.
5. Click **Properties** to open the **Line Properties** dialog box.
6. Define the line properties as you require and click **OK**.

Create or Edit a Line Type

Line types are used for categorizing the lines in your <plant>. Each line must belong to a particular line type, for example, **Process** or **Utilities**. You can create as many line types as required and move the existing lines from one type to another.

1. Start the Instrument Index module.
2. To open the **Lines** dialog box, do one of the following:
 - Click **Tables > Lines**.
 - Open the **Tag Number Properties** dialog box, click  next to the **Line** list arrow.
3. Click  next to the Line type list arrow.
4. In the **Line Type** dialog box, click **New** to append a new data line.
5. Type the line type name and description in the appropriate fields.
6. To modify a line type, highlight the required line type and click in the desired field.

TIP To quickly find a line type in a long list of line types, type the line type name in the **Find Line Type** box. SmartPlant Instrumentation will automatically highlight the line type you are looking for.

Change Type of Line

This option shows you how to change the line type of an existing line.

1. Start the Instrument Index module.
2. To open the **Lines** dialog box, do one of the following:
 - Click **Tables > Lines**.
 - Open the **Tag Number Properties** dialog box, click  next to the **Line** list arrow.
3. From the **Line type** list, select the required line type.
4. Select the required line in the data window.
5. Click **Change Type**.
6. In the **Change Type** dialog box, highlight the required line type and click **OK**.

TIP If the required line type does not exist, click **Cancel** to close the **Change Type** dialog box, then click  next to the **Line type** list arrow, to create or modify a line type. For more details, see *Create or Edit a Line Type* (on page 120).

Copy Line Data

You use this option to copy line process data from a selected line to one or more target lines.

1. Start the Instrument Index module.
2. To open the **Lines** dialog box, do one of the following:
 - Click **Tables > Lines**.
 - Open the **Tag Number Properties** dialog box, click  next to the **Line** list arrow.
3. From the **Line type** list, select the required line type.
4. Select the source line from which you want to copy process data.
5. Click **Copy Line**.

6. On the **Copy Line Data** dialog box, from the **Line Type** list, select the required line type of the target line.
7. In the **Target lines** data window, highlight the target lines to which you want to copy the source line data.

TIP You can use the filter facility to display only the required lines in the Target lines data window.

8. Click **OK** to start the copying process.

NOTE You can also copy line process data while working in the Process Data module. The Process Data module allows you to select a source line in the **Copy Line Data** dialog box different from the one you highlighted in the **Lines** dialog box.

Delete a Line

This option shows you how to delete a line that is no longer in use. Note that you cannot delete a line that is associated with a tag number.

1. Start the Instrument Index module.
2. To open the **Lines** dialog box, do one of the following:
 - Click **Tables > Lines**.
 - Open the **Tag Number Properties** dialog box, click  next to the **Line** list arrow.
3. From the **Line type** list, select the required line type or select the **Show all line types** check box.
4. Highlight the required line in the data window.
5. Click **Delete**.

Define or Modify Pipe Specifications

Pipe spec is a specification that defines various process conditions for a specific pipe. You use this procedure to define a pipe spec to the **Pipe Specs** supporting table from the Instrument Index module, or to modify properties of an existing pipe spec.

1. Start the Instrument Index module.
2. To open the **Lines** dialog box, do one of the following:
 - Click **Tables > Lines**.
 - Open the **Tag Number Properties** dialog box, click  next to the **Line** list arrow.
3. On the **Lines** dialog box, under **Line type**, select a line type, or click  to create a new line type.
4. Click **New** to open the **Line Properties (New)** dialog box.
5. Beside the **Pipe spec** list, click  to open the **Pipe Specs** dialog box.
6. Do one of the following:
 - To create a new pipe spec, click **New** and type entries in the **Pipe Spec** and **Description** boxes.
 - To edit an existing pipe spec, click a field in a highlighted row and modify the existing entry as needed.

SECTION 10

Editing and Viewing Data in a Browser View

You can edit the data fields in a browser view by either selecting one row or by selecting multiple rows. The single-edit mode is useful when you need to edit one row or a few rows. The multi-edit mode is a more powerful tool. In addition to being able to edit multiple rows, you can also carry out certain editing operations that are not available in the single-edit mode.

You can view, organize, and edit your instrument index data by opening an Instrument Index Standard Browser view in the Browser module. You can also add a PowerSoft browser that supports the display of tag data and define a view for it to use with the Instrument Index module.

In the selected browser view, you can access numerous commands to manage your instrument index data. You can edit the tag number properties in the multi-edit or single-edit mode, create new loop and tag numbers, associate an instrument with a tag category, associate and open external documents, generate process data sheets and specifications for tags, and so forth.

Define a Standard Browser View for the Instrument Index

This procedure shows you how to create and define a designated custom browser view in the Instrument Index Standard Browser. When you view and edit tags from the Instrument Index browser using a browser view the **Browse** command opens this designated custom browser.

1. Open the **Browser Manager** by doing one of the following:
 - From an existing Instrument Index Standard Browser view, click .
 - On the main SmartPlant Instrumentation tool bar, click .
 - Click **File > Browser Manager**.
2. On the **Browser Manager**, on the **Browser groups** pane, expand the hierarchy **Instrument Index > Instrument Index Standard Browser**.
3. Do one of the following:
 - Open an existing view for this browser.
 - Click .
 - Right-click and on the shortcut menu click **Add View**.
4. On the **View profile** pane, select **Set as default view** and **Set as Instrument Index browse view (per user)** boxes.
5. Click **Save**.
6. Expand the Instrument Index Standard view.
7. Click **Style**, and on the **Style** pane click **Edit**.
8. Select the fields you want to see in the browser and click **Save**.
9. Right-click **Instrument Index Standard Browser**, and on the shortcut menu, click **Set as Default**.
10. Close the **Browser Manager**.

Edit a Single Row

This option shows you how single-row editing allows you to modify the data for one tag number at a time from a browser view. You edit the data by typing or selecting values from the available lists. You can also use the buffer to copy data from one row and then paste in multiple rows as needed.

1. Open an Instrument Index Standard Browser view by doing one of the following:
 - Click **Actions > Browse Index**.
 - Click .
2. Highlight the required tag number.
3. Click in a required field to edit the data, and do one of the following:
 - Type over the displayed value.
 - Select an item from a list. If the item you need is not on the list you just opened or if it is a long list and you need to scroll down to find your value, click  to open the appropriate supporting table where you can find the required item on the fly. For more details, see *Open a Specific Supporting Table* (on page 124).
4. Press **Tab** to move to the next field.

NOTES

- Fields that hold tag number data (**Name**, **Prefix**, **Number**, and **Suffix**) cannot be edited.
- Changes you make to a record are automatically saved to the database when you proceed to another record or when you close the browser view.

Open a Specific Supporting Table

This option shows you how to open the supporting table dialog box for an active column in an Instrument Index Standard Browser view. There are two main uses of this feature:

- Adding, editing, duplicating or deleting items in a supporting table. For more details, see *Supporting Tables: Overview* (see "Supporting Tables" on page 34).
 - Finding a select list item in an active column of the browser view on the fly. This option is especially useful when you have a long list of items in a select list and you need to scroll up or down to find the item you need. Opening a supporting table for that select list enables you to quickly find the required item which will automatically be selected for you after closing the supporting table dialog box.
1. Open an Instrument Index Standard Browser view by doing one of the following:
 - Click **Actions > Browse Index**.
 - Click .
 2. Highlight a tag number row.
 3. Click a specific supporting table cell in the highlighted row and do one of the following:
 - Click **Actions > Open Supporting Table**.
 - Click .
 4. In the supporting table dialog box that opens, type the item you are looking for in the **Find** box.

TIPS

- Clicking **OK** closes the supporting table and displays the selected item in the list
- If the item you are looking for does not exist in the supporting table, click **New** and add an item. Clicking **OK** after adding the new item automatically selects this item in the active select list in the browser view.

Find a Record in a Browser View Column

This option shows you how to search the displayed instrument index data for a specific record. You can search for any record that exists in any of the browser view columns. For example, you can find a specific tag number, an instrument type, or an I/O type, and so forth. The following search options are available:

- Find a record by entering the whole value, for example, 101-FV 100 (the full tag number name) or CONTROL VALVE (the full instrument type value).
 - Find a record by entering a string which is a part of a value, for example, FV (or just V) or CONTROL VALVE (the full instrument type value).
 - Search for a record as you type in the value.
1. Open an Instrument Index Standard Browser view by doing one of the following:
 - Click **Actions > Browse Index**.
 - Click .
 2. Click a column header to select the column you want to search. Note that all the fields in the column become highlighted.
 3. Do one of the following:
 - Click **Edit > Find**.
 - Click .
 4. Select **Case sensitive** if you want to distinguish between uppercase and lowercase characters. When selected, SmartPlant Instrumentation finds only those instances in which capitalization matches the text you typed in the data field.
 5. Select the required Match option:
 - **Whole value** — searches for occurrences that are whole values and not part of a larger value.
 - **String** — searches for a particular string that you type in the data field.
 - **As typed** — searches for a value as you type it in the data field.
 6. Click **Find**.
 7. Click **Find** again to find the next occurrence.
 8. Close the **Find** dialog box when done.

Sort Tag Rows in a Browser View

This option show you how to sort the tag number rows in an Instrument Index Standard Browser view by a selected column for the current work session. You can set a default sorting sequence for the browser view that takes effect every time you open the browser view. You use the following procedure to override the default sorting sequence for the current session. After closing the browser view, the sorting sequence you set now will be lost and the default one will be applied when you reopen the browser view. You can sort the rows in ascending or descending order as needed.

1. Open an Instrument Index Standard Browser view by doing one of the following:
 - Click **Actions > Browse Index**.
 - Click .
2. Double-click the column header by which you want to sort the tag numbers.

TIP The first time you double-click a header, the software sorts the data in ascending order – an arrow pointing down appears next to the header.

3. To sort the data in descending order, double-click the same header again. An arrow pointing up appears next to the header according to which the data is sorted.

NOTE After closing the browser view, the sorting sequence you set now will be lost and the default one will be applied when you reopen the browser view.

Edit Instrument Tag Data in Multi-Row Mode

This option shows you how to use the multi-row mode to select several rows of tag number data that you can edit. You select the required tag numbers by highlighting multiple tag rows in the browser view. The editing is done in the **Tag Number Properties** dialog box, from which you also have access to the appropriate supporting tables if you need to update the available options in the lists.

1. Open an Instrument Index Standard Browser view by doing one of the following:
 - Click **Actions > Browse Index**.
 - Click .
2. Select the desired tag numbers using the **Shift** and **Ctrl** keys.
3. Do one of the following:
 - Click **Edit > Properties**.
 - Click .
 - Right-click the selected tag numbers, and then on the shortcut menu, click **Tag Number Activities > Properties**.
4. In the **Tag Number Properties** dialog box, edit the data for each tag as you require. You can also do the following:
 - Click **New Loop** to create a new loop number and then associate it with the current tag number.
 - Click **New** to create a new tag number.
5. When you have edited data for a particular tag number, click **Apply**.
6. Click **Next** or **Previous** to move from one tag number to another.

Count Instrument Tag Rows in a Browser View

This option shows you how to count the total number of tag number rows currently displayed in an Instrument Index Standard Browser view, where each tag number row represents one record in the database. When selecting several tag number rows, you can count both the total and the selected number of records. Also, when the list of records is long, you can count the total number of tag number rows before the software finishes retrieving the records from the database.

1. Open an Instrument Index Standard Browser view by doing one of the following:
 - On the Instrument Index menu bar, click **Actions > Browse Index**.
 - Click .
2. Select as many tag number rows as required.
3. Do one of the following:
 - Right-click the highlighted row or rows, and on the shortcut menu, click **Count Records**.
 - Click **Actions > Count Records**.
 - Click .

View Point-to-Point Wiring Diagrams

This option shows you how with a tag that contains wiring information, you can open the point-to-point wiring diagram directly from an Instrument Index Standard Browser view.

1. Open an Instrument Index Standard Browser view by doing one of the following:
 - Click **Actions > Browse Index**.
 - Click .
2. Do one of the following:
 - Click **Actions > Documents**.
 - Click .
3. In the **Documents** pop-up window, select **Tag Signal Diagram**.

View Data History in a Browser View

SmartPlant Instrumentation can indicate changes to the data currently displayed in an Instrument Index Standard Browser view with the data stored in the audit trail repository for the date range that you specify. You can choose any or all of the following modes of emphasis:

- Set a color to emphasize changes on the screen.
- Set a shade of gray to emphasize the changed data in printed reports and their previews.
- Set bold and italic font style for emphasis on the screen and in print.

History indication is available only if the System Administrator has activated the audit trail functionality. When the audit trail functionality is activated, each time that you save data after making changes, the data is recorded in the audit trail repository.

1. Open an Instrument Index Standard Browser view by doing one of the following:
 - Click **Actions > Browse Index**.
 - Click .
2. On the menu bar, click **Options > History Options**.
3. Select the date range for data history comparison, by doing one of the following:
 - In the **From** and **To** data fields, type the appropriate dates. To set the **To** data field value as today's date, click **Today**.
 - Select the appropriate dates using the spinners.
4. To set a font style to emphasize changes on the screen and in print, do one or both of the following:
 - Select **Bold**.
 - Select **Italic**.
5. To change the color used to display changes on the screen:
 - a. Beside the **Highlight color for display** box, click .
 - b. In the **Color** dialog box, choose the color that you require.
 - c. Click **OK** to save your new color settings and return to the **History Options** dialog box.
6. To change the shade of gray used to emphasize the changed data in printed reports and their previews:
 - a. Beside the **Grayscale for printing** box, click .
 - b. In the **Grayscale** dialog box, slide the bar to the required position.

- c. Click **OK** to save your new grayscale settings and return to the **History Options** dialog box.
7. Click **OK** to save your current history options and close the **History Options** dialog box.
8. On the menu bar, click; **Options> Mark Changes** to mark changes in the data currently displayed in the browser view for the dates that you specified in the **History Options** dialog box.

NOTE To clear all history indications in the browser view, cancel the **Mark Changes** selection on the **Options** menu.

Set a Date Range for Field Value Changes

This option shows you how to define a period within which you can track changes made to a specific value in an Instrument Index Standard Browser view.

1. Open an Instrument Index Standard Browser view by doing one of the following:
 - Click **Actions > Browse Index**.
 - Click .
2. Click **Options > Date Range for Changes**.
3. In the **From** field, select or enter the date from where you want to start displaying the changes using the **DD/MM/YYYY** format.
4. In the **To** field, select or enter the date until where you want to display the changes using the **DD/MM/YYYY** format. Click **Today** to display the current date in the **To** field.
5. Click **OK** to accept your settings and close the dialog box.

Track Field Value Changes

This option shows you how you can view the changes you have made to a value in any field, in an Instrument Index Standard Browser view. Each field can display one specific instrumentation value. You can view both the new and the old values, and generate a report that displays these changes.

1. Open an Instrument Index Standard Browser view by doing one of the following:
 - Click **Actions > Browse Index**.
 - Click .
2. Select the tag numbers that you require.
3. Right-click, and from the shortcut menu, select **Field Value Changes**.
4. Click **Print** to generate and print out a value changes report.

NOTES

- To shorten the period within which you want to track field changes, set a date range.
- The system records field value changes in the audit trail repository. Before using this option on Sybase Adaptive Server Anywhere, make a revision in the Document Binder module to add records to the audit trail repository. This operation is required because on Sybase Adaptive Server Anywhere, if you want to track field value changes, the audit trail repository must not be empty.
- Under **Previous values** in the **Field Value Changes** dialog box, for the value you have selected in the browser view, you can view the previous values, the date of the value change, the user name of the user who changed the value, and the change status.

Open a Process Data Sheet from the Browser Window

This option shows you how you can quickly access a process data sheet from the **Browser** window. You can open an existing process data sheet directly from an Instrument Index Standard Browser view and then perform the appropriate action in the module that opens.

1. On the main SmartPlant Instrumentation menu, click **File > Preferences**.
2. In the tree view pane, click  beside **Process Data** to expand the tree.
3. Click **General**.
4. In the **Browser view options** group box, select **Always** from the **Open process data sheet** list.
5. Click **OK** to close the **Preferences** dialog box.
6. In an Instrument Index Standard Browser view, select the instrument tags you require and click  on the main toolbar to access the process data sheets.

Open a Specification Sheet from the Browser Window

This option shows you how you can quickly access specifications for selected instruments from the **Browser** window. You can open an existing specification directly from an Instrument Index Standard Browser view and then perform the appropriate action in the module that opens.

1. On the main SmartPlant Instrumentation menu, click **File > Preferences**.
2. In the tree view pane, click  beside **Specifications** to expand the tree.
3. Click **General**.
4. In the **Browser view options** group box, select **Always** from the **Open specification sheet** list.
5. Click **OK** to close the **Preferences** dialog box.
6. In an Instrument Index Standard Browser view, select the instrument tags you require and click  on the main toolbar to access the specification sheets.

Open a Calculation Sheet from the Browser Window

This option shows you how you can quickly access a calculation sheet from the **Browser** window. You can open an existing calculation sheet directly from an Instrument Index Standard Browser view and then perform the appropriate action in the module that opens.

1. On the main SmartPlant Instrumentation menu, click **File > Preferences**.
2. In the tree view pane, click  beside **Calculation** to expand the tree.
3. Click **General**.
4. In the **Browser view options** group box, select **Always** from the **Open calculation sheet** list.
5. Click **OK** to close the **Preferences** dialog box.
6. In an Instrument Index Standard Browser view, select the instrument tags you require and click  on the main toolbar to access the calculation sheets.

Display Existing Wiring Connections

This option shows you how to display existing wiring connections for selected instrument tags in an Instrument Index Standard Browser view, where you can then modify them if required.

1. On the Instrument Index Browser view, highlight the tags you require.
2. Right-click the highlighted tags and on the shortcut menu click **Device Panel Connection**.

Open I/O Assignment from a Browser View

This option shows you how to access the I/O Assignment window for an instrument you selected in the Instrument Index Standard Browser view. This way you can implement the input/output assignment for the selected tags on the fly, by- passing the Wiring Module window.

1. On the Instrument Index Browser view, highlight the tag you require.
2. Right-click the highlighted tag and on the shortcut menu click **I/O Assignment**.

Change the Process Function and Instrument Type in Batch Mode

It is possible to change the process function and the instrument type of multiple tag numbers in batch mode. You can choose whether to change both the process function and the instrument type or only the instrument type.

1. On an Instrument Index Standard Browser view, select the required tag numbers.
2. Right-click the selected tag numbers and on the shortcut menu, click **Tag Number Activities > Change Instrument Type**.
3. In the **Select New Process Function and Instrument Type** dialog box, do one of the following:
 - To change both the process function and the instrument type in batch mode, from the **Process function** list, select the required process function, and on the data window highlight the required instrument type.
 - To change only the instrument type in batch mode, on the data window, select a different instrument type.
4. Click **OK**.
5. On the **Tag Number Renaming Options** dialog box, do one of the following:
 - Select the **Keep general process data** option to delete only process data that is specific for each tag number.
 - Select the **Delete process data** option to delete all the process data associated with the tag numbers.
6. Select **Change all** so that SmartPlant Instrumentation does not prompt you to change the process function and the instrument type for each tag number.

TIP Before clicking **OK**, note that all the wiring items that were associated with the old CS tag will be renamed according to the new control system tag name, and all the specifications associated with the tags will be deleted. Verify that the appropriate loop blocks and hook-ups are associated with the new tag number.

7. Click **OK** when done.

NOTES

- If among the tags whose process function and instrument type you are changing there are control system tags, SmartPlant Instrumentation reopens the **Tag Number Renaming Options** dialog box, so that you can rename the CS tags if you want to.
- To find and select the instrument type that you require quickly, start typing in the **Find instrument type** field, and the software highlights the record in the data window as you type. If the instrument type is not available, you can create a new one. For more details, see *Working with Instrument Types*.

SECTION 11

Generating Documents

SmartPlant Instrumentation enables you to generate various reports and documentation to help you keep track of your <<plant>> and the items in it. For example, the Loop Summary report, gives you an exact picture of all the loop numbers in use within your <<plant>>, including those that do not have instrument tags associated with them. All the reports are easily accessible from the Standard Index Browser and include:

- Specification sheets
- Process Data sheets
- Drawing and Revision reports
- Available tag lists
- Loop Summary

Generate a Specification Sheet for an Instrument

This option shows you how to generate specifications for the instruments you select in an Instrument Index Standard Browser view. This option is useful when you need to create a specification for a tag number for which a specification profile was defined after the tag number had been created. Note that this option is applicable only to instruments for which you have not generated specifications yet and if the tag has a specification data profile.

1. Open an Instrument Index Standard Browser view by doing one of the following:
 - Click **Actions > Browse Index**.
 - Click .
2. Select the required tag numbers and do one of the following:
 - Click **Actions > Apply Profile > Generate a Specification Sheet**.
 - Right-click the selected tag numbers and on the shortcut menu click **Apply Profile > Generate a Specification Sheet**.
3. In the **Results** dialog box, take note of the generation results and then click **Close**.
4. Access the new specification sheet by doing one of the following:
 - Select the required tag numbers in the browser view and click .
 - Select the required tag numbers in the browser view, click **Actions > Documents**.

Generate a Process Data Sheet for an Instrument

This option shows you how to generate process data sheets for the instruments you select in an Instrument Index Standard Browser view. This option is useful when you need to create a process sheet for a tag number for which a process data profile was defined after the tag number had been created. Note that this option is applicable only to instruments for which no process data sheets have been generated yet, and has an appropriate instrument type.

1. Open an Instrument Index Standard Browser view by doing one of the following:
 - Click **Actions > Browse Index**.
 - Click .
2. Select the required tag numbers and do one of the following:
 - Click **Actions > Generate a Process Data Sheet**.

- Right-click the selected tag numbers and on the shortcut menu click **Generate a Process Data Sheet**.
3. In the **Results** dialog box, take note of the generation results and then click **Close**.
 4. Access the new specification sheet by doing one of the following:
 - Select the required tag numbers in the browser view and click .
 - Select the required tag numbers in the browser view, click **Actions > Documents**.

Generate a Drawing and Revision Report

This option shows you how to view and print out a report listing the drawings (documents) and the drawing revision data for the tag numbers currently displayed in an Instrument Index Standard Browser view. The report displays all the appropriate tags according to the filtering and sorting conditions that you defined for the browser view. You can display any of the following drawings:

- Specification
- Process data sheet
- Calculation sheet
- Loop drawing
- Hook-up drawing
- P&ID drawing

You can also display revision data for all of the above drawings, except P&ID drawings.

1. Open an Instrument Index Standard Browser view by doing one of the following:
 - Click **Actions > Browse Index**.
 - Click .
2. Click **Actions > Drawing Report**.
3. In the **Select Drawings and Revisions** dialog box, do one of the following:
 - Under **Drawings**, select the check boxes beside the drawings you want to include in the drawing report or check the **Select all drawings** check box.
 - Under **Revisions**, select the check boxes beside the revisions you want to include in the report or check the **Select all revisions** check box.
4. Click **OK** to generate the report.

NOTE If revisions are available they can only be selected after the appropriate drawings have been selected.

Create a List of Available Tags

This option shows you how to generate a report that lists all the available numeric segments of tag numbers in the current <unit> or <plant>.

1. On the Instrument Index Module window, click **Reports > Available Tag Numeric Segments**.
2. On the **Generate Available Tags List** dialog box, do the following to set your report criteria:
3. In the **Numeric segment range** group box, type the range of numbers that will be included in the report.
4. Select **Current <unit>** or **<plant>** to specify the plant hierarchy level for the tag numbers that will be included in the report.
5. For one process function, in the **Process function selection** group box, select **Process function** and then the required process function from the list.

6. For all the existing process functions, select the **Select all** option. You can also select the **Include process functions with available numbers** check box if you want to include the process functions available with the loop numbers numeric segments.
7. If the domain type is **Owner operator**, select the **Exclude tag number ranges reserved for other projects** check box to compare the numeric tag number segments of your project against those of other projects, and exclude those numeric tag number segments that have been reserved in other projects.
8. Click **OK**.

Generate Loop Summary Reports

This option shows you to how generate a summary report of the existing loop numbers in the current <unit> or in all the <units> in the <plant>. You can generate the following summary reports:

- Summary of all loop numbers.
 - Summary of loop numbers with no associated tags.
1. On the Instrument Index Module window, click **Reports > Loop Summary**.
 2. In the **Report Selection Options** dialog box, do one of the following:
 - Select **Current <unit>**, so that you can generate a loop summary report of the loop numbers in the <unit> you are working.
 - Select **Current <plant>**, so that you can generate a loop summary report of the existing loop numbers in all the <units> in the current <area>.
 - Select **All <units> in the <plant>**, so that you can generate a loop summary report of the existing loop numbers in all the <units> in the current <plant>.
 3. Click **OK**.
 4. In the **Loop Selection** dialog box, do one of the following:
 - Select **All loops** to generate the Summary of All Loop Numbers report.
 - Select **Loops with no associated tags** to generate Summary of Loop Numbers with no Associated Tags report.
 5. Click **OK**.
 6. When prompted select **Yes** to preview the report before printing, select **No** to print the report without previewing first.

Generate Custom Table Reports

This option shows you how to generate a report that displays the values used in one or more custom tables. Custom tables hold user-defined information for instrument tags. You can only use custom tables after the Domain Administrator creates the custom tables and names them as appropriate.

1. On the Instrument Index Module window, click **Reports > Tables > Custom Tables**.
2. On the **Select Custom Tables for Report** dialog box, select a check box from the **Include** column, beside every custom table that you want to include in the report.

TIP Select the **Include all** check box, to include all of the available custom tables into the report.

SECTION 12

Working with External Documents

External documents, that are associated with instrument tags, serve as an additional document for the storage of information that cannot be directly entered into SmartPlant Instrumentation. These documents can be viewed and modified from SmartPlant Instrumentation. Each document can be associated with a number of Instrument tags and can be in any format supported by your Windows environment, such as .doc, .txt, .bmp, .wav, and so forth.

Associate an External Document with Instrument Tags

This option shows you how to associate an external document to existing instrument tags.

1. Open an Instrument Index Standard Browser view.
2. Highlight the instrument tags you want to associate with an external file.
3. Click **Actions > Associate Documents**.
4. On the **Associated Documents** dialog box, click **Associate**.
5. On the **Associate External Document** dialog box, navigate to the required file and click **Open**.
6. Click the **Description** field and type a brief description as needed.
7. Click **OK**.

Open an External Document Associated with an Instrument Tag

This option shows you how to open an external file associated with an instrument. You can do this on the fly while associating files with an instrument. SmartPlant Instrumentation starts the appropriate application that is associated with the file you want to open.

1. Open an Instrument Index Standard Browser view.
2. Highlight the required tag numbers.
3. Click **Actions > Associate Documents**.
4. On the **Associated Documents** dialog box, highlight the file you want to open.
5. Do one of the following:
 - Click **Open**.
 - Double click the highlighted file.

Dissociate an External Document from an Instrument Tag

This option shows you how to dissociate an external document from the instrument tags.

1. Open an Instrument Index Standard Browser view.
2. Highlight the required instrument tags.
3. Click **Actions > Associate Documents**.
4. On the **Associated Documents** dialog box, highlight the external file you want to dissociate.
5. Click **OK**.

View Associated Documents

Tag numbers in SmartPlant Instrumentation are associated with various documents whether these are documents generated by the software or external documents that can be opened with another application. SmartPlant Instrumentation displays the type of document that is associated with a selected tag number in the **Documents** pop-up window from which you can open the appropriate document on the fly.

Using this option, you can view the following documents associated with a tag number:

- Various reports generated in other modules: Specifications, Process Data, Calculation, and so forth.
 - Enhanced SmartLoop drawings.
 - Loop drawings generated using your CAD application (SmartSketch, AutoCAD or MicroStation).
 - Hook-Up drawings.
 - External documents created using other applications.
1. Open an Instrument Index Standard Browser view.
 2. Select the required tag numbers and then do one of the following:
 - Click **Actions > Documents**.
 - Click .
 3. On the **Documents** pop-up window, click one of the available options to display the print preview of the available documents. The disabled options represent unavailable document types.
 4. To view external documents, on the **Documents** pop-up window:
 - a. Click **Other**.
 - b. On the **Associated Documents** dialog box, select a document.
 - c. Click **Open**.
 5. To view associated CAD drawings, on the **Documents** pop-up window:
 - a. Click **CAD Loop Drawings**.
 - b. On the **View Drawing File** pop-up window, open the CAD drawing.
 6. To view associated hook-up drawings, on the **Documents** pop-up window:
 - a. Click **Hook-Up Drawing**.
 - b. On the **Associated Hook-Up Drawings** dialog box, select the required drawing.
 - c. Click **View**.

NOTE You can generate a report showing all the tags in the browser view and their related documents. To generate a report, click **Actions > Related Documents Report**.

Process Data Module

The Process Data module enables you to efficiently define process conditions for a particular instrument or line. These process conditions then become the reference point for the system. Process data for instruments relates to seven process functions: Flow, Temperature, Pressure, Level, Analyzer, Control Valve, and Relief Valve. The data - including the process units of measure - can be modified at any time when desired.

Batch creation of process data sheets can be done by adapting existing instruments and lines using an interface that allows process characteristics to be simultaneously assigned to several instrument groups, thus ensuring system-wide integrity.

The Process Data module shares data with loop components that are associated with a given process. Data is also shared with the Specifications, Calculations, and Instrument Index modules, allowing all the data from these modules to be incorporated into generated reports.

Process Data Principles

SmartPlant Instrumentation enables you to store and manage process data for lines and instruments.

To view process data for instruments, enter the tag number directly when prompted, or use the search parameters. To view line process data, select a line on the **Select Line** dialog box.

If instruments or lines have none or partial process data attached, you can do either enter new data or modify existing data, including automatic conversion of units as desired.

NOTES

- When the Workflow option is activated, only instrument tags with status **Process Data Required** are visible in process data sheets. For details regarding workflow implementation, see *Workflow* (on page 54).
- Saving process data modifications makes them accessible to other modules. When you generate a report that includes process data, you can set SmartPlant Instrumentation to prompt you that the relevant process data has been changed.
- You cannot generate process data sheets for virtual tags.

See Also

Adding a New Line Type (see "Add a Line Type" on page 147)

Modifying Line Properties (see "Modify Line Properties" on page 150)

Working With Instrument Tags in the Process Data Module

These procedures explain how work with instrument tags in the Process Data module. Although you usually create tags in the Instrument Index module, the ability to create tags in the Process Data module allows for efficient creation of complex analyzers, for example, stream and component tags.

Create an Instrument Tag in the Process Data Module

This procedure explains how to create an instrument tag in the Process Data module. Although you usually create tags in the Instrument Index module, the ability to create tags in the Process Data module allows for efficient creation of complex analyzers, for example, stream and component tags.

1. In the **Process Data** window, on the module toolbar, click **Instrument** .
2. In the **Enter Tag Number** dialog box, type the name of the new tag number, and click **OK**.
3. If the **Select Instrument Type** dialog box opens (because there is more than one record for a given instrument type acronym), select the desired instrument type and click **OK**.
4. In the **Loop Name** dialog box, do one of the following:
 - Accept the displayed loop number and click **OK**.
 - Type the loop number that you need and click **OK**.
 - To create the tag number without a loop association, click **Cancel**.
5. In the **Tag Number Properties** dialog box, on the **General** tab, enter the appropriate values.

TIPS

 - If you are creating a complex analyzer, do **NOT** at this point select a line from the **Line** list.
 - For details of how to enter power supply properties, see *Enter Power Supply Data for Panels and Instrument Tags* (on page 94).
6. Click **OK**.

Open an Instrument Tag in the Process Data Module

This procedure explains how to open an instrument tag in the Process Data module. Although you usually create tags in the Instrument Index module, the ability to create tags in the Process Data module allows for efficient creation of complex analyzers, for example, stream and component tags.

1. On the module toolbar, click **Instrument** .
2. In the **Enter Tag Number** dialog box, do one of the following:
 - Type the desired tag number.
 - Click **Find** to open the **Find Tag** dialog box and find a desired tag number.
3. Click **OK**.

Define Basic Process Data for an Instrument Tag

This procedure explains how to define basic process data for an instrument tag in the Process Data module. Although you usually create tags in the Instrument Index module, the ability to create tags in the Process Data module allows for efficient creation of complex analyzers, for example, stream and component tags.

1. Do one of the following to open a tag in the Process Data module:
 - Create a tag.
 - Open a tag that you created previously.
2. In the **Process Data** dialog box, do the following:
 - a. Select a fluid state.

NOTE If you select **N/A or Other**, all fields under the **General**, **Properties**, **Additional Properties** and **Base Conditions** will open for editing, other than **Fluid phase** and **Fluid name source**, which will be disabled.
 - b. If you are creating an analyzer, do one of the following from the **Analyzer type** list:
 - To create a simple analyzer, select **Simple**.
 - To create a complex analyzer, select **Complex**.
 - c. Click **OK**.

IMPORTANT Simple analyzers belong to the **Conventional Tag Class**.
3. If the **Complex Analyzer Tag Manager** dialog box opens, define the complex analyzer. For details, see *Defining a Complex Analyzer* (see "Define a Complex Analyzer" on page 165).
4. In the process data sheet for the tag that you opened, under **Line number**, select the line number to which the tag is connected.

TIPS

 - If you confirm the prompt to copy the line data, all relevant line properties and data are copied to the tag process data sheet that you are editing.
 - If you selected a line that you configured for a complex analyzer, SmartPlant Instrumentation copies the data from the **Line Component** table for that line into the **ANALYZER / COMPONENT PROPERTIES** section of the data sheet.
5. Enter the remaining process data as needed.
6. If you are defining a complex analyzer, link analyzer stream component tags with line components, see *Linking Analyzer Stream Components with Line Components* (see "Link Analyzer Stream Components with Line Components" on page 166).
7. If you are defining a simple or a complex analyzer, in the **ANALYZER COMPONENT / PROPERTY** section, enter values and units of measure in the **Repeatability**, **Accuracy**, **Minimum detection limit**, and **Range** fields as needed.
8. On the module toolbar, click .

Edit Instrument Process Data

This procedure explains how to edit the process data associated with an instrument tag. You can edit instrument process data from the Process Data module or from the Calculation module.

1. Open the process data sheet for an instrument tag from the Process Data module or the Calculation module.
2. In the **Process Data** window, modify the process data values as desired.

TIPS

- If you are creating a multi- case tag, you can enter values for each case that you create (for details, see *Multiple Process Data Cases* (on page 153)).
- If the Domain Administrator enabled the use of process data custom fields, the above sections can display such fields.

3. On the module toolbar, click  to save the values.

NOTE If you select **N/A** or **Other**, all fields under the **General**, **Properties**, **Additional Properties** and **Base Conditions** will open for editing, other than **Fluid phase** and **Fluid name source**, which will be disabled.

Modify Instrument Base Conditions

Use this procedure to modify base condition values when entering data for Control Valve, Relief Valve, or Flowmeter calculations, from the Process Data or Calculation modules.

1. Open the process data sheet for an instrument tag from the Process Data module or the Calculation module.
2. Scroll to the **BASE CONDITIONS** section.
3. Select a base pressure unit of measure, and beside **Pressure** type the base pressure.
4. Select a temperature scale, and beside **Temperature**, type the base temperature.
5. According to the state that you selected under **Fluid**, select the desired basic property as follows:
 - a. If the state is solid/powder, do one of the following:
 - Select **Density @base**, select a unit of measure, and type the density value.
 - Select **Specific Gravity @base**, and type the specific gravity value.
 - b. If the state is liquid, do one of the following:
 - Select **Density @base**, select a unit of measure, and type the density value.
 - Select **Specific Gravity @base**, and type the specific gravity value.
 - c. If the state is water, do one of the following:
 - Select **Density @base**, select a unit of measure, and type the density value.
 - Select **Specific Gravity @base**, and type the specific gravity value.
 - d. If the state is gas/vapor, do one of the following:
 - Select **Density @base**, select a unit of measure, and type the density value.
 - Select **Compressibility @base**, and type the compressibility value.
 - e. If the state is steam, beside **Compressibility @base**, type the desired value.
6. To save your changes, on the module toolbar, click .

Copy Instrument Process Data from Another Instrument

This option allows you to copy instrument process data from any existing instrument to the currently selected instrument.

1. Open the target process data sheet.
2. In the **Process Data** window, on the **Edit** menu, point to **Copy** and click **From Instrument**.
3. In the **Enter Tag Number** dialog box, do one of the following:
 - In the text box, type the source tag number.
 - To search for the source tag, click **Find**.

TIP You can only copy data from a tag number of the same instrument type.

NOTES

- Downstream data (if defined) is not copied.
 - You cannot copy data from an analyzer tag.
4. To select a source case other than the governing case, do the following:
 - a. Click **Change**.
 - b. In the **Select Case** dialog box, from the **Available cases** list, select the source case.
 - c. Click **OK**.
 5. In the **Enter Tag Number** dialog box, click **OK**.

Propagating Line Process Data to an Instrument Tag

These procedures allow you to propagate relevant process data from a line to the current tag. Before you perform either of these procedures, you can set a filter that limits the fields that you propagate (for details, see *Setting the Line-to-Tag Filter* (see "Select Line Properties" on page 145)).

NOTES

- The current procedures propagate line process data to a single tag. For details of how to propagate line data to more than one tag, see *Batch Propagation of Line Data to Instrument Tags* (see "Propagate Line Data to a Batch of Instrument Tags" on page 144). Preventive Maintenance technician options include filling out test results.
- Use the current procedures to propagate multi-case process data from a line to a tag, since the batch procedure propagates process data from the governing case only.

Propagate Process Data From the Current Line to the Current Instrument

1. Open and edit the process data sheet for the instrument to which you want to propagate process data from a line.
2. On the **Edit** menu, point to **Copy** and then click **From Line**.

Propagate Process Data From Any Line to the Current Instrument

1. Open and edit the process data sheet for the instrument to which you want to propagate process data from a line.
2. In the **GENERAL** section of process data sheet, from the **Line number** list, select the line from which you want to propagate the process data to the current tag.

TIP SmartPlant Instrumentation automatically propagates the relevant process data from the line that you select to the current tag.

Propagate Line Data to a Batch of Instrument Tags

This procedure allows you to propagate process data from a particular line to tags that you select. Before you perform this procedure, you can set a filter that limits the fields that you propagate (for details, see *Setting the Line-to-Tag Filter* (see "Select Line Properties" on page 145)).

NOTE This procedure propagates the governing case only. For details of how to propagate all cases from a given line to a given tag, see *Propagating Line Process Data to an Instrument Tag* (on page 143).

1. Do one of the following:
 - Open the **Process Data Module** window.
 - Open a process data sheet for a line.
2. On the **Actions** menu, click **Propagate Line Data**.
3. In the **Propagate Line Data** dialog box, from the **Line number** list, select the source line from which you want to propagate the data to the tags.
4. To select a group of target tags, select one of the following options from the **Propagation method** list:
 - Include all tags
 - Include all tag numbers with process data
 - Include all tag numbers without process data

TIP To select target tags individually, click **Find** to open the **Find Tag** dialog box, where you select the specific target tags.
5. In the **Propagate Line Data** dialog box, click **Propagate**.

TIP The propagated results are shown in the **Processed tags** data window (a selected box in the **Done** column signifies successful processing of data).
6. Click **Close**.

Select Line Properties

This procedure enables you to set a process data line-to-tag filter. When you propagate process data from lines to instruments, only the selected properties are propagated. The current filter settings affect both of the following procedures:

- *Propagating Line Process Data to an Instrument Tag* (on page 143)
 - *Batch Propagation of Line Data to Instrument Tags* (see "Propagate Line Data to a Batch of Instrument Tags" on page 144)
1. In the **Process Data Module** window, on the **Edit** menu, click **Select Line Properties for Copying**.
 2. In the data window, clear the selection of fields that you do not want to copy from lines to tags.
TIP If you want to select a few fields only for copying, select and then clear the **Select all** check box to clear all the fields first.
 3. Click **OK**.

Define Process Data for Differential Pressure Instruments

NOTE After setting the default units of measure for the current unit in the **Units of Measure and Accuracy** dialog box, you can select the desired default unit of measure for Differential Pressure (DP instrument).

1. Open the desired pressure instrument process data sheet.
2. From the **Pressure type** list, select **Differential Pressure**.

TIPS

- The **Pressure property** label changes to **Differential pressure**.
 - From the unit of measure flag lists throughout the process data sheet, you can select the **Differential** unit of measure flag.
3. Under **PROPERTIES** and **ADDITIONAL PROPERTIES**, enter the appropriate process data values.
 4. Under **ALARM**, define the alarm and trip settings as needed.

Delete Instrument Process Data

This option enables you to delete instrument process data. Note that you cannot delete any tags in the Process Data module. Tag numbers are deleted in the Instrument Index module.

IMPORTANT The deletion process is **irreversible**. Once you have deleted the process data, you **cannot** restore it!

1. With the **Process DataModule** window open, on the **Edit** menu point to **Delete Process Data** and click **Instrument**.
2. In the **Enter Tag Number for Deletion** dialog box, do one of the following:
 - In the text box, type tag for which you want to delete process data.
 - To search for the tag, click **Find**.
3. Click **OK**.

Calculate the Properties of a Selected Material

The Fluid Properties Database allows you to calculate the properties of the chosen material according to its pressure and temperature.

The calculated properties are:

For Liquid	For Gas
Density and Specific Gravity	Density and Specific Gravity
Vapor pressure	Compressibility
Viscosity	Viscosity
Liquid Heat Capacity	Specific Heat Ratio

NOTE This option is not available for materials where the **Fluid state** is **Solid/Powder** or **N/A** or **other** nor for 2-phase **Fluid phase**.

1. Open the desired process data sheet.
2. In the **Process Data** window, from the **Fluid name source** list, select **Database**.
3. From the **Fluid** list, select the desired fluid.
4. In the **PROPERTIES** section, enter the appropriate pressure and temperature values.

NOTES

- SmartPlant Instrumentation calculates and displays changed values.
- SmartPlant Instrumentation uses the AIChE databank to calculate physical properties; therefore your values must comply with the AIChE temperature limits. AIChE data does not provide accurate calculation of density, compressibility, and specific gravity for ethylene and propylene at critical pressure and temperature. For this reason, the software implements the procedure described in William C. Reynolds, SI, Department of Mechanical Engineering, Stanford University.
- To calculate liquid density, on the **Options** menu, click **Calculate Liquid Compressibility**.
- To calculate the steam properties, on the **Options** menu, click **Saturated Steam**.

SECTION 13

Managing Lines and Line Types

This section deals with creating and managing line types and lines.

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Add a Line Type

This option enables you to add a new line type to the **Line Type** list in the **Select Line** dialog box.

1. In the **Process Data Module** window, on the module toolbar, click .
2. In the **Select Line** dialog box, next to the **Line Type** list, click .
3. In the **Line Types** dialog box, click **New**.
4. Type the new line type name and description in the appropriate fields.
5. Click **OK**.

Edit a Line Type

This procedure explains how to edit a line type.

1. In the **Process Data Module** window, on the module toolbar, click .
2. In the **Select Line** dialog box, beside the **Line type** list, click .
3. In the **Line Type** dialog box, make the necessary changes.
4. Click **OK**.

Change the Line Type

This procedure explains how to change the line type for a specific line.

1. In the **Process Data Module** window, on the module toolbar, click .
2. In the **Select Line** dialog box, do one of the following:
 - To display lines of all line types, select **Show all line types**.
 - From the **Line type** list, select the current line type of the desired line.
3. In the data window, select the desired line, and click **Change Type**.
4. Select the new line type and click **OK**.

Delete a Line Type

This option enables you to delete a line type. You cannot delete a line type if it includes a record, i.e., if it is associated with a line.

1. In the **Process Data Module** window, on the module toolbar, click .
2. In the **Select Line** dialog box, next to the **Line Type** list, click .
3. In the data window, select the line type that you want to delete, and click **Delete**.
4. Click **OK**.

NOTE Line numbers cannot be deleted in the Process Data module — only process data. You can delete a line only in the Instrument Index module.

Add a New Line

Use this procedure to add a new line from the Process Data module.

1. In the **Process Data Module** window, do one of the following:
 - On the process data toolbar, click .
 - Click **Edit > Open Process Data > Line**.
2. On the **Select Line** dialog box, from the **Line type** list, select a line type.

TIP To create a new line type, click  beside the **Line type** list.
3. Click **New**.
4. On the **Line Properties (New)** dialog box, complete the data fields of the left column as follows:
 - a. In the **Line number** box, type the desired value.
 - b. From the **P&ID** list, select the drawing associated with this line.
 - c. In the **Stream name** box, type the optional stream name.
 - d. From the **Pipe material** list, select the desired pipe material.
 - e. From the **Pipe spec** list, select the pipe spec, or click  to open a dialog box where you manage pipe specs.
5. To complete the data fields of the right column, do one of the following:

- From the **Pipe standard list**, select **ANSI**, **DIN**, or **ASME DN**. This opens the **Pipe Data Library** dialog box. Select one of the default sets of pipe data, or click **New** to define a custom library item and enter your own pipe data values.
 - From the **Pipe standard list**, select **Other** and enter the remaining right column values manually.
6. On the **Line Properties** dialog box, click **OK**.
 7. On the **Select Line** dialog box, click **OK**.
 8. If the **Process Data** dialog box opens, select a fluid state and click **OK**.
 9. In the **Line Process Data** window, enter process data for the new line.
 10. Click **Actions > Save Process Data**.

See Also

Managing Line Component Tables (on page 164)

Duplicate a Line

1. On the **Domain Explorer**, expand your current <plant> hierarchy to display the **Lines** folder.
2. Double-click the **Lines** folder to display the existing lines.
3. Right-click the loop you want to duplicate, and on the shortcut menu, click **Duplicate**.
4. On the **Line Properties** dialog box, type the new line number.
TIP The data field on the **Line Properties** dialog box displays the line name template which is based on the line naming convention defined by the Domain Administrator. In the alphanumeric and the numeric parts of the name, you can type any character (letters, digits, spaces, and so forth).
5. If required, do the following to create the duplicated line in a different <unit> in the current domain:
6. On the **Line Properties** dialog box, click **OK**.
7. The duplicated line has the same piping data as the line it was duplicated from, however, you can change the pipe associated with the line as follows:
8. On the **Line Properties** dialog box, click **Pipe Data**.
9. Select the appropriate line and click **OK**.

Line Fluid Velocity

SmartPlant Instrumentation calculates the line fluid velocity according to the line internal diameter and volumetric fluid flow at flow conditions.

If you enter fluid flow as mass or volumetric flow at standard / normal / base conditions, SmartPlant Instrumentation will calculate volumetric flow at flow conditions first (using density values) and then the line fluid velocity.

NOTE For flowmeters, fluid velocity at operating conditions is calculated automatically according to fluid flow and line internal diameter. If the mass flow value has been entered, density is required for fluid velocity calculation.

View Line Process Data

This procedure allows you to view a line process data before editing it.

1. In the **Process Data Module** window, on the module toolbar, click .
2. In the **Select Line** dialog box, select the desired line type from the **Line type** list to filter the data screen. Select **All Line Types** check box to display all available lines.
3. Highlight the desired line number and click **OK**.
4. If the **Process Data** dialog box opens, select a fluid state and click **OK**.
5. In the **Line Process Data** window, click .

Modify Line Properties

You can edit line data in either the Process Data or the Instrument Index modules. This procedure applies to the Process Data module.

1. In the **Process Data Module** window, do one of the following:
 - On the process data toolbar, click .
 - On the **Edit** menu, point to **Open Process Data** and click **Line**.
2. In the **Select Line** dialog box, select the row containing the line data you want to edit.
3. Click **Properties** to open the **Line Properties** dialog box.
4. Modify the appropriate values in the **Line Properties** dialog box as follows:
 - Edit the line number name.
 - Select another pipe material.
 - Select another pipe standard.
 - Select another pipe spec.
5. When done, click **OK** to return to the **Select Line** dialog box.

Define Line Process Data

Use this procedure to define process data for a line using the Process Data module options. It not possible to define line process data in batch mode.

1. In the **Process Data Module** window, do one of the following:
 - On the process data toolbar, click .
 - On the **Edit** menu, point to **Open Process Data**, and click **Line**.
2. On the **Select Line** dialog box, do the following:
 - a. From the **Line type** list, select a line type.
 - b. In the data window displaying the lines that belong to the selected line type, select a line with the **No** value in the **PD Exists** column.
 - c. Click **OK**.
3. On the **Process Data** dialog box, select a fluid state and click **OK**.
4. In the **Line Process Data** window, enter process data for the new line.
5. On the **Actions** menu, click **Save Process Data**.

Edit Pipe Data Library

Use this procedure to add new pipes to the Pipe Data Library.

- In the **Process Data Module** window, do one of the following:
 - On the process data toolbar, click .
 - Click **Edit > Open Process Data > Line**.
- On the **Select Line** dialog box, from the **Line type** list, select a line type.
- Click **Properties**.
- On the **Line Properties** dialog box, from the **Pipe standard** list, select **ANSI**, **DIN**, or **ASME DN**. This opens the **Pipe Data Library** dialog box.

NOTE In the **Default** column, **Yes** indicates a default library item, and **No** indicates that the item is user-defined.
- On the **Pipe Data Library** dialog box, click **New**.

TIP If you want to view details of an item which exists in the Pipe Data Library, highlight that item and click **Properties**.
- On the **Library Item Properties (New)** dialog box, type the desired pipe data values and click **OK**.
- On the **Pipe Data Library** dialog box, click **OK**.
- On the **Line Properties** dialog box, click **OK**.
- On the **Select Line** dialog box, click **OK**.

Edit Line Process Data - Selecting Pipe Standards

This topic summarizes the behavior of the pipe parameters under the **GENERAL** section of the **Line Process Data** window. There are parameters that you set directly, and others that you set from the **Pipe Data Library** dialog box.

For all pipe standard options — **ANSI**, **DIN**, **ASME DN**, and **Other** — you can edit the **Pipe material** and **Pipe spec** parameters directly.

The following table summarizes the behavior of the software and availability of parameters for editing according to the pipe standard you select.

Pipe Standard	Parameters Set from Pipe Data Library	Editable Parameters
ANSI	Line size, Line schedule, Line internal diameter, Wall thickness	
ASME DN	Line size, Line schedule, Line internal diameter, Wall thickness	
DIN	Line size, Nominal pressure, Line internal diameter	Wall thickness
Other		Line size and its unit of measure, Line internal diameter, Wall thickness

NOTES

- If you change your **Pipe standard** selection from any different value to **ANSI**, **DIN**, or **ASME DN**, the **Pipe Data Library** dialog box opens.
- For the pipe standards **ANSI**, **DIN**, or **ASME DN**, to open the **Pipe Data Library** dialog box without changing the pipe standard, click **Actions > Pipe Data**.

Edit Line Process Data - Fluid

A fluid is a material characterized according to state, name, and phase.

- **Fluid state:** Indicates whether the fluid is **Liquid**, **Water**, **Gas/Vapor**, **Steam**, **Solid/Powder** or **N/A or Other**. Selecting the fluid opens the properties section with the appropriate parameters for selection.
- **Fluid name source:** When the **User-defined** option is selected from the list, you can type the name of the fluid in the text box.
- **Fluid phase:** The phase indicates whether the fluid is single or 2-phase. This selection is for information only.

NOTE If you select **N/A or other** in **Fluid state**, **Fluid name source** and **Fluid phase** are disabled.

Copy Line Data from One Line to Another

This option allows to copy line data from a selected line to another line or to a group of lines. If you are creating a complex analyzer with multi-stream analysis for a given physical line, you need to create multiple virtual lines, each representing a stream. You can use this procedure to copy settings from one instance of such a line to the others.

1. In the **Process Data Module** window, on the **Actions** menu, click **Copy Line Data**.
2. Under **Source lines**, do one of the following from the **Line types** list:
 - Select **All Line Types**.
 - Select a specific line type.
3. Under **Line number**, select the source line.
4. Under **Target lines**, do one of the following from the **Line types** list:
 - Select **All Line Types**.
 - Select a specific line type.
5. In the data window, select the target lines.

TIPS

- You can use the filter data field to locate a specific line. Type the name of the desired line / P&ID / stream in the respective field and click the **Apply Filter** button. SmartPlant Instrumentation highlights the line you were looking for. Another possibility is to select the **As typed** check box and then type the line/P&ID/Stream name in the respective field. The data is filtered as you type.
 - You can sort the rows according to a column by double clicking the column's header.
6. Click **Copy** to copy the data to the selected target lines.

Delete Line Process Data

This procedure enables you to delete process data for a given line.

IMPORTANT Before deleting process data, note that deleted process data cannot be restored.

1. With the **Process Data Module** window open, on the **Edit** menu, point to **Delete Process Data** and select **Line**.
2. In the **Select Line to Delete Process Data** dialog box, do one of the following to display in the data window those lines whose process data has been defined:
 - From the **Line type** list, select the desired line type.
 - Select the **Show all line types** check box to display all the existing lines with process data.
3. Highlight the desired line in the data window.
4. Click **OK**.

Multiple Process Data Cases

A given instrument or line is often used for more than one operating service. For example, a dual-fuel control system might use a single supply line and control valve to carry various fuels, gas or liquid. Each group of process data settings that you enter for a given instrument or line is called a case.

NOTE Each case has a separate drawing with its own revisions. Each drawing includes the case name as part of the drawing name.

Create Process Data Cases

Use these procedures to do the following:

- Enable cases for a tag or a line by assigning a case name to the current process data
- Add additional cases to the tag or the line, thus creating multiple cases.

NOTE Case names that you assign to a given line or tag can be duplicates of names that you assign to cases in other lines and tags.

For either of these procedures, do one of the following:

- Open the process data sheet for an instrument tag from the Process Data module or the Calculation module.
- Open a process data sheet for a line.

Enable Cases for the Current Tag Or Line

On the **Actions** menu, click **Enable Case**.

1. In the **Enable Case** dialog box, do one of the following to select a case name for the current data:
 - Select an existing case name from the **Available cases** list.
 - To create a new case name, click  to open a dialog box where you can create new case names.
2. Click **OK**.

Add a Case for the Current Tag Or Line

1. On the **Actions** menu, click **Add Case**.
2. In the **Add Case** dialog box, do one of the following to select a name for the new case:
 - Select an existing case name from the **Available cases** list.
 - To create a new case name, click  to open a dialog box where you can create new case names.
3. Click **OK**.
4. Enter and save process data for the case that you created.

NOTE The **Design Temperature** and **Design Pressure** fields in the **Additional Properties** section of a process data sheet, are common to all cases associated with the data sheet. Any action (data entry, editing, or deletion of data) in these fields is reflected in all the cases, irrespective of which case the action was carried out on.

Set a Governing Case

A governing case is the set of process data values for a line or a tag that you select as the active case. If for a given line or a tag you create more than one case, SmartPlant Instrumentation requires that you select a governing case. If you define a single case, the software automatically sets it as the governing case.

Use this procedure to select a governing case for a line or a tag.

NOTE Once you have enabled cases for line or a tag, if there is only one case, SmartPlant Instrumentation automatically defines it as the governing case. If you subsequently enable additional cases, the first case still remains the governing case until you set a new governing case.

1. Do one of the following:
 - Open the process data sheet for an instrument tag from the Process Data module, Calculation module, or **Domain Explorer**.
 - Open a process data sheet for a line.
2. In the **GENERAL** section of the process data sheet, from the **Case** list, select the case that you want to be the governing case.
3. On the **Actions** menu, click **Set as Governing**.

NOTE The **Design Temperature** and **Design Pressure** fields in the **Additional Properties** section of a process data sheet, are common to all cases associated with the data sheet. Any action (data entry, editing, or deletion of data) in these fields is reflected in all the cases, irrespective of which case the action was carried out on.

Manage the Cases Supporting Table

You use cases to enable multiple sets of process data for a given instrument or line. Use these procedures to create, edit and delete case names and their descriptions. You can manage the **Cases** supporting table from the Process Data module or the Calculation module.

NOTE Case names that you assign to a set of process data for a given line or tag can be duplicates of names that you assign to cases in other lines and tags.

1. To open the **Cases** supporting table do one of the following:
 - In the **Process Data Module** window menu bar, click **Edit > Cases**.
 - In the Calculation module, create a case for a tag and do one of the following:
 - In the **Enable Case** dialog box, click .
 - In the **Add Case** dialog box, click .
2. To add a new case name, click **New**, and then type a unique case name and an optional description.
3. To edit an existing case name, click a value that you want to edit, and modify values as needed.
4. To delete a case name, select the record that you want to delete, and click **Delete**.

TIP SmartPlant Instrumentation does not allow you to delete a case name that is currently used on any process data sheet.

NOTE The **Design Temperature** and **Design Pressure** fields in the **Additional Properties** section of a process data sheet, are common to all cases associated with the data sheet. Any action (data entry, editing, or deletion of data) in these fields is reflected in all the cases, irrespective of which case the action was carried out on.

Delete a Process Data Case

Use this procedure to delete a process data case that you created for a line or a tag.

IMPORTANT Deletion of a case is irreversible.

1. Do one of the following:
 - Open the process data sheet for an instrument tag from the Process Data module or the Calculation module.
 - Open a process data sheet for a line.
2. Click **Actions > Delete Case**.

Process Analyzers

Process analyzers measure physical or chemical properties of a process flow. SmartPlant Instrumentation supports two types of process analyzers — simple and complex.

Simple Analyzers

A simple analyzer measures one physical or chemical property of a process fluid at the point of measurement or fluid sampling.

IMPORTANT Simple analyzers belong to the **Conventional Tag Class**.

Complex Analyzers

A complex analyzer also measures physical and chemical properties of a process flow at the point of measurement or fluid sampling. However, you have the following elements of flexibility in a complex analyzer:

- You can create multiple stream tags.
- For each stream tag, you can create multiple component/property tags.

You can use the complex analyzer methodology even where only a single component / property is measured, if the data sheet information requires specifying the complete process fluid composition for all components.

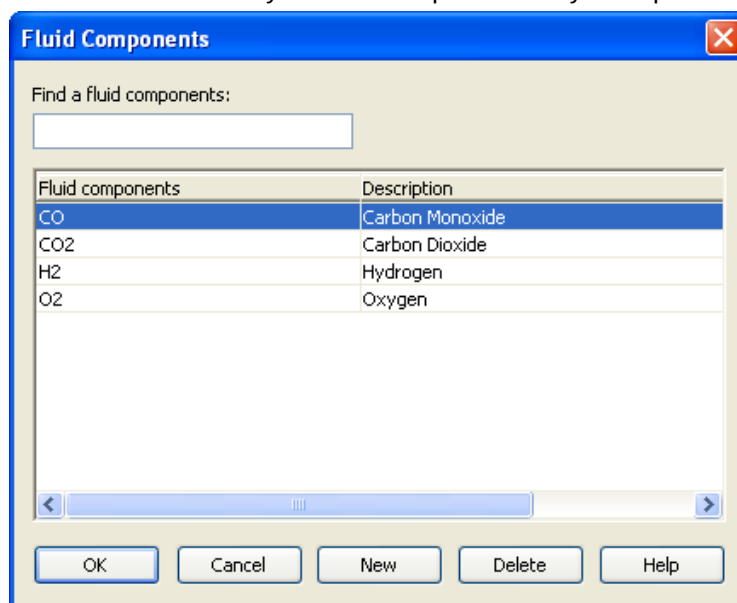
Although the application determines whether you define some analyzers as simple or complex, gas chromatographs are by their nature complex. Even if you consider one stream only, in general you will want to utilize the ability of a gas chromatograph to analyze various components/properties in the stream.

Flow of Activities for Complex Analyzers

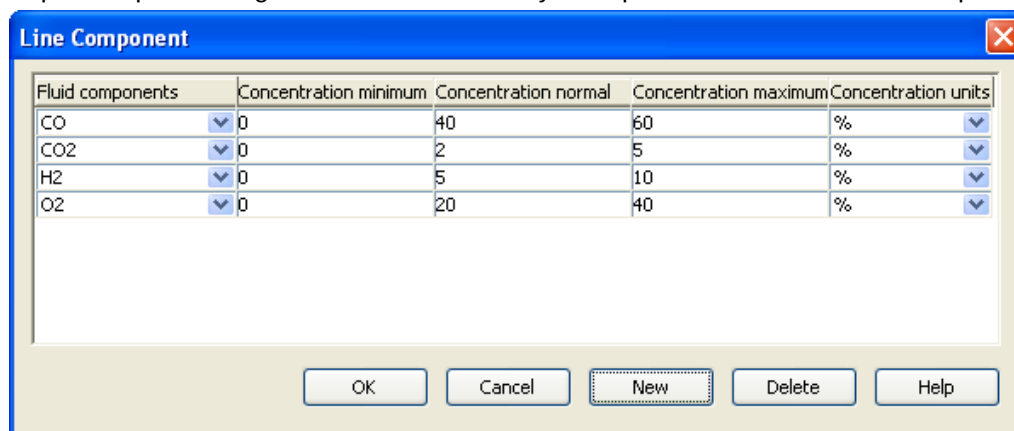
This topic describes the flow of activities for defining a complex analyzer, for example a gas chromatograph.

1. Define the required fluid components in the **Fluid Components** supporting table.
 - a. In the Process Data module, click **Edit > Fluid Components**.

- b. Click **New** and define your fluid components as you require. For example:

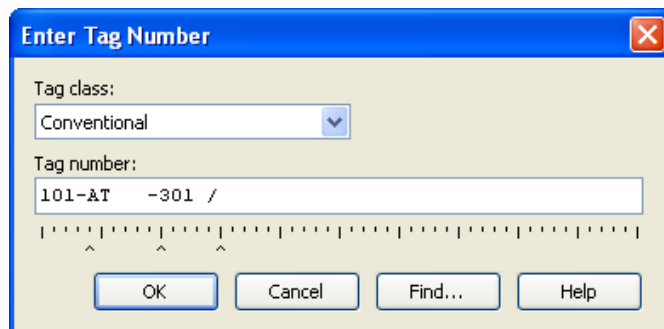


2. Open a process data sheet for a new line and define it as you require.
For details, see *Define Line Process Data* (on page 150).
3. For each line that you associate with a complex analyzer, define a line components table. This table lists the fluid components of this line, together with their minimum, normal, and maximum concentrations.
 - a. Open an appropriate process data sheet for a line.
 - b. Click **Edit > Line Components**.
 - c. On the **Line Components** dialog box, click **New**.
 - d. Under **Fluid Component**, select an available fluid component.
 - e. Under **Concentration Units**, accept the default % or select the unit of measure that you need.
 - f. Type values for minimum, normal, and maximum concentration.
 - g. Repeat steps **c** through **f** for all the lines that you require and click **OK**. For example:



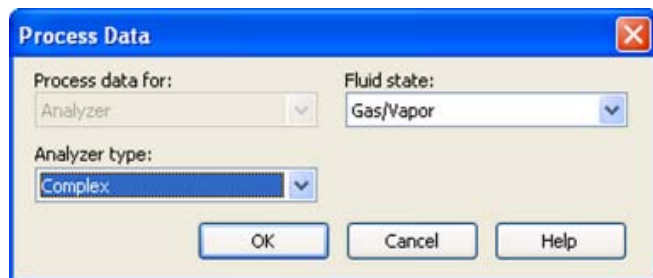
4. In the Process Data module, create a complex analyzer tag.
 - a. Click **Instrument** .

- b. On the **Enter Tag Number** dialog box, define a tag number that has an **Analyzer** process function.



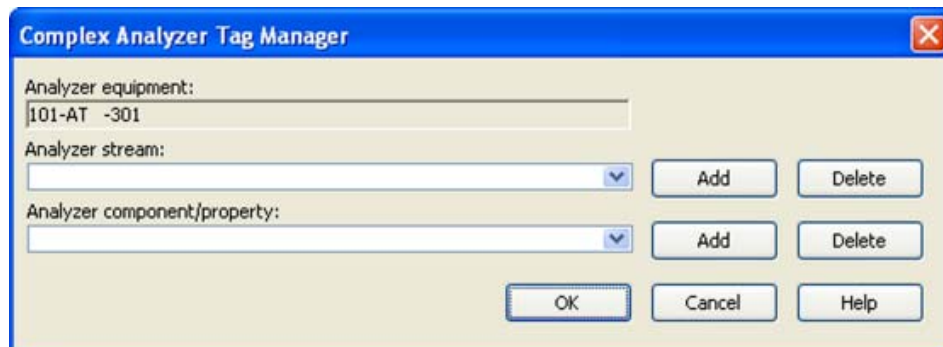
The **Enter Tag Number** dialog box has a title bar with a close button. It contains two main input sections. The first section, labeled 'Tag class:', has a dropdown menu currently showing 'Conventional'. The second section, labeled 'Tag number:', has a text input field containing '101-AT -301 /'. Below this field is a horizontal ruler with tick marks and three upward-pointing arrows. At the bottom of the dialog are four buttons: 'OK', 'Cancel', 'Find...', and 'Help'.

- c. On the **Process Data** dialog box, from the **Analyzer type** list, select **Complex**.



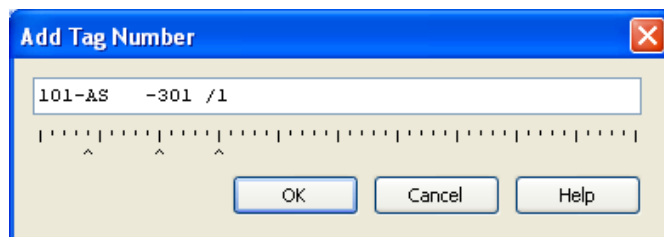
The **Process Data** dialog box has a title bar with a close button. It contains three input sections. The first section, labeled 'Process data for:', has a dropdown menu showing 'Analyzer'. The second section, labeled 'Fluid state:', has a dropdown menu showing 'Gas/Vapor'. The third section, labeled 'Analyzer type:', has a dropdown menu showing 'Complex'. At the bottom of the dialog are three buttons: 'OK', 'Cancel', and 'Help'.

- d. Click **OK** to open the **Complex Analyzer Tag Manager**.



The **Complex Analyzer Tag Manager** dialog box has a title bar with a close button. It contains three input sections. The first section, labeled 'Analyzer equipment:', has a text input field containing '101-AT -301'. The second section, labeled 'Analyzer stream:', has a dropdown menu and two buttons, 'Add' and 'Delete'. The third section, labeled 'Analyzer component/property:', has a dropdown menu and two buttons, 'Add' and 'Delete'. At the bottom of the dialog are three buttons: 'OK', 'Cancel', and 'Help'.

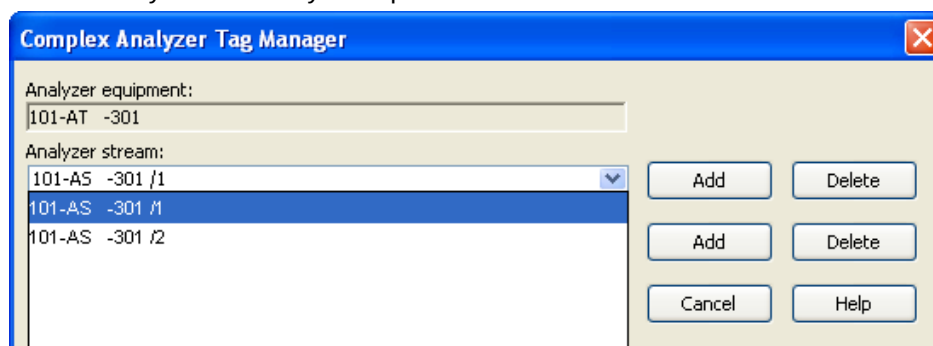
5. Do the following for each stream tag that you want to define:
 - a. To the right of the **Analyzer stream** list, click **Add**.
 - b. On the **Add Tag Number** dialog box, type the name of the stream tag that you want to create.



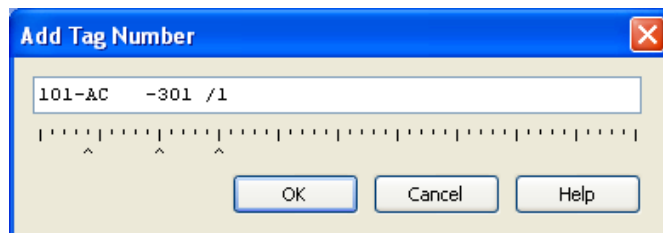
The **Add Tag Number** dialog box has a title bar with a close button. It contains one main input section labeled 'Tag number:', which has a text input field containing '101-AS -301 /1'. Below this field is a horizontal ruler with tick marks and three upward-pointing arrows. At the bottom of the dialog are three buttons: 'OK', 'Cancel', and 'Help'.

- c. On the dialog boxes that open, define properties as needed.

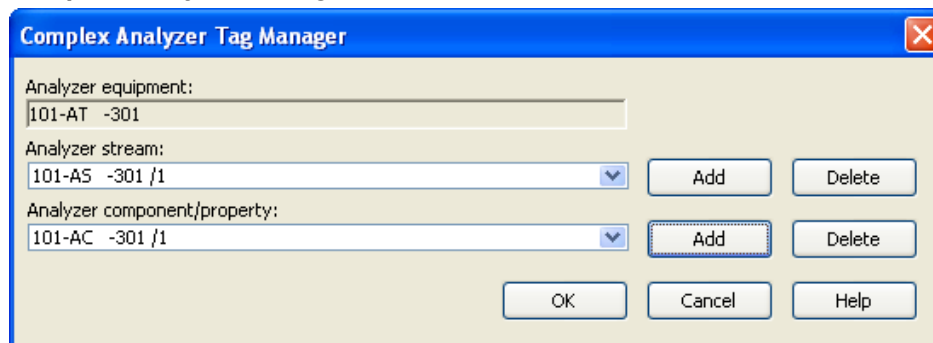
- d. Add as many streams as you require.



6. For each stream that you added to the analyzer stream list, do the following to create component tags that correspond to every stream:
- In the **Complex Analyzer Manager**, click **Add** to the right of the **Analyzer component/property** list.
 - On the **Add Tag Number** dialog box, type the name of the component tag that you want to create.



- On the dialog boxes that open, define properties as needed.
- Add as many components as you require. After adding all the required streams, the **Complex Analyzer Manager** should look like so:



7. Click **OK** on the **Complex Analyzer Tag Manager** dialog box.

8. In the Process Data sheet that opens, from the **Line number** list, select an appropriate line.

The screenshot shows the 'GENERAL' section of the Process Data sheet. A dialog box titled 'Analyzer Process Data' is open, asking 'Do you want to copy data from line?' with 'Yes' and 'No' buttons. The background form has the following fields:

- Case: [dropdown]
- Service: [text box]
- Fluid state: [dropdown]
- Fluid phase: [dropdown]
- Fluid name source: [dropdown]
- Fluid name: [text box]
- Analyzer stream: [dropdown]
- Location: [text box]
- Line number: [dropdown]
- Line size: [text box] in
- Line schedule: [text box]
- Flow: [text box]
- Pressure: [text box]
- Temperature: [text box]
- Viscosity: [text box]
- Density: [text box] kg/m³
- Specific gravity: [text box]
- Compressibility: [text box]
- Specific heat ratio: [text box]

9. Click **Yes** to copy the line data to the current process data sheet or click **No** and enter the data yourself.
10. In the **GENERAL** section of the process data sheet, select the analyzer stream that you want to define.

The screenshot shows the 'GENERAL' section of the Process Data sheet. The 'Analyzer stream' dropdown is open, showing a list of streams: 101-AS -301 /1, 101-AS -301 /1, and 101-AS -301 /2. The first two are highlighted in blue. The background form has the following fields:

- Case: [dropdown]
- Service: [text box]
- Fluid state: [dropdown]
- Fluid phase: [dropdown]
- Fluid name source: [dropdown]
- Fluid name: [text box]
- Analyzer stream: [dropdown]
- Location: [text box]
- Line number: [dropdown]
- Line size: [text box] in
- Line schedule: [text box]
- Flow: [text box]
- Pressure: [text box]
- Temperature: [text box]

11. In the **ANALYZER COMPONENT / PROPERTY** section, do the following for each tag in the **Analyzer/component** list:
 - a. Select the analyzer component tag.

The screenshot shows the 'ANALYZER COMPONENT / PROPERTY' section. The 'Analyzer component/property' dropdown is open, showing a list of components: 101-AC -301 /1, 101-AC -301 /1, and 101-AC -301 /2. The first two are highlighted in blue. The background form has the following fields:

- Analyzer component/property: [dropdown]
- Line component: [text box]
- Repeatability: [text box] %
- Minimum detection limit: [text box] %

- b. From the **Line component** list, select the fluid component that you want to link with the analyzer component tag.

NOTE After selecting the line component, the software displays the concentrations that you specified.

- c. Enter values and units of measure in the **Repeatability**, **Accuracy**, **Minimum detection limit**, and **Range** fields as needed.

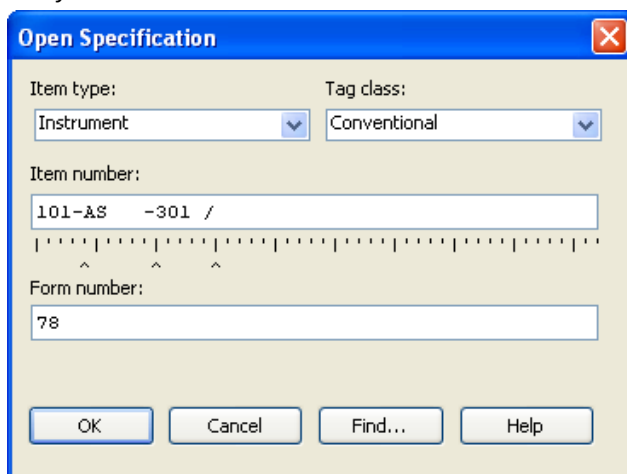
- d. Repeat steps **a** through **c** to define each analyzer component. Note that you need to save the data when switching to another analyzer component.
12. When done, click and then close the process data sheet.
13. Do the following to create a complex analyzer specification:
- In the Specifications module, click .
 - On the **Open Specification** dialog box, enter the required tag and form number for the main analyzer equipment and then click **OK**.

TIP Form 77 is a shipped form for main analyzer equipment. This form is supplied with SmartPlant Instrumentation as part of the shipped data.

- c. In the specification that opens, enter the required data and click . For example:

GENERAL	1	Tag Number	101-AT -301	
	2	Functional Location		
	3	Process Location	Main analyzer building	
	4	Equipment No.		
	5	Class		
	6	Serial No.	WIN No.	12345
	7	Analyzer Shelter ID		
	8	Service		
	9	Line Number		
	10	P&ID		
	11	Area Classification		
	12	EQA	Accuracy priority	
	13	Number of Streams	Number of Programs	2
	14			
	15	Redundant	No	
	16	Communication Protocol with Analyzer		
	17	Communication Protocol with DCS		
PURCHASE	18			
	19	Manufacturer	TEXAS INSTRUMENTS	
	20	Model		
	21	Purchase Order Number		
	22	Price	Item Number	
	23	Manufacturer Serial Number		

- d. Close the specification.
- e. In the Specifications module, on the lower toolbar, click .
- f. On the **Open Specification** dialog box, enter the required tag and form number for the analyzer stream and click **OK**.



The **Open Specification** dialog box has a blue title bar with a close button. It contains two dropdown menus: 'Item type:' set to 'Instrument' and 'Tag class:' set to 'Conventional'. Below these is a text field for 'Item number:' containing '101-AS -301 /'. Underneath the text field is a horizontal ruler with tick marks and three upward-pointing arrows. Below the ruler is a text field for 'Form number:' containing '78'. At the bottom are four buttons: 'OK', 'Cancel', 'Find...', and 'Help'.

TIP Form 78 is a shipped form for analyzer streams. This form is supplied with SmartPlant Instrumentation as part of the shipped data.

- g. Click **OK** to open the **New Specification** dialog box.
- h. Select the **Create multi-tag specification** option.

- i. From the **Format** list, select an appropriate multi-tag format. Make sure that you have defined the required multi-tag format.

New Specification

☐ Create single-item specification
☒ Create multi-tag specification
☐ Add tag to existing multi-tag specification

Document number: 101-AS -301 /1-SP

Format: Analyzer Stream Components

Document numbers: [Empty list box]

Tag numbers: [Empty list box]

OK Cancel View Help

- j. Click **OK** to open the multi-tag specification that includes the following data:

- Analyzer equipment data is displayed in the **GENERAL** section:

GENERAL	1	Tag Number	101-AT -301
	2	Functional Location	
	3	Process Location	Main analyzer building
	4	Equipment No.	
	5	Class	
	6	Serial No.	12345
	7	Analyzer Shelter ID	
	8	Service	
	9	Line Number	
	10	P&ID	
	11	Area Classification	
	12	EQA	
	13	Number of Streams	2
	14	Number of Programs	

- The **CHARACTERISTICS** section points to the **Multi-Tag List** page (SEE LIST), which contains the data of the analyzer components. If, instead of the SEE LIST text, you want to display the name of the master tag for the **Stream** property, on the **Specifications Preferences**, select the **Show master tag** check box and delete the text under **Customize the SEE LIST** label.

CHARACTERISTICS	STREAM	24	Stream	[101-AS -301 /1]
		25	Process Location Line / Equipment	3"-P-1504-11H /
		26	Class	
		27	Analyzer Tag	
	COMPO-NENTS	28	Fluid Service	Lean Feed
		29	Components	
		30	Range	
		31	Repeatability	
	PROPER-TIES	32	Alarm: Type/Set@	
		33	Pour point	
		34	Corrosive Component	No
		35	Solid Component	

- The stream process data is displayed in the OPERATING CONDITIONS section:

O P E R A T I O N G C O N D I T I O N S	TAP (SUPPLY)	37	Process connection - existing													
		38	Fluid State				Gas									
		39	Mass in Proc.Line Min.													
		40	Operating Pressure		Min.	Norm.	Max.	12	bar-g		13	bar-g		14	bar-g	
		41	Operating Temperature		Min.	Norm.	Max.	150	°C		150	°C		150	°C	
		42	Design Pressure		Design Temperature			50	bar-g			250		°C		
		43	Density @Oper.Cond.		Min.	Norm.	Max.	890	kg/m³		890	kg/m³		890	kg/m³	
		44	Viscosity @Oper.Cond.		Min.	Norm.	Max.	0.1	cP		0.1	cP		0.1	cP	
		45	Bubble point			Norm.	Max.	°C						°C		
		46	Dew point @ Tmin			Min.	Max.	°C						°C		
	47	Solids Size		Solids Quantity			mm						g			
	48	Compressibility		Water Concentr. Max												
	49	Vapor Pressure				0.9						bar-g				
	50	Flow volume operating		Min.	Norm.	Max.	25	Am³/h		30	Am³/h		32	Am³/h		
	RETURN	51	Process connection - existing													
		52	Operating Pressure		Min.	Norm.	Max.	bar-g		bar-g		bar-g				
		53	Operating Temperature		Min.	Norm.	Max.	°C		°C		°C				
		54	Design Pressure		Design Temperature			bar-g				°C				
55																
56																

- Enter the required data on page 1 and page 2 of the specification sheet.
- Click the **Multi-Tag List** tab to define the associated analyzer components.
- On the menu bar, click **Actions > Add Tags**.
- On the **Add Tag** dialog box, type the name of the associated component or click **Find** to find the required tag.

Stream	Components	Components	Components	Component	Measur.	Range Min	Range Max	Range UOM
101-AC -301 /1	0	20	40	%	O2			%
101-AC -301 /2	0	5	10	%	H2			%
101-AS -301 /1								

- Repeat steps **f** through **n** for each stream.

Managing Line Component Tables

For each line that you defined for a complex analyzer tag, you need to create a line components table. This table lists the fluid components of this line, together with their minimum, normal, and maximum concentrations.

The **Line Components** table that you create individually for each line is based on a **Fluid Components** supporting table — which you also manage — that is available for all lines.

For both procedures, open a process data sheet for the line for which you want to create a **Line Components** table.

Manage the Fluid Components Supporting Table

NOTE You can also perform this procedure from the **Process Data** window.

- On the **Edit** menu, click **Fluid Components**.
- To create a new fluid component, click **New**.
- Click a value that you want to edit and modify the value as needed.

Create A Line Components Table For The Current Line

1. Click **Edit > Line Components**.
2. For each fluid component that you want to enable for the current line, do the following:
 - a. Click **New** to add a new row.
 - b. Under **Fluid Component**, select an available fluid component.
 - c. Under **Concentration Units**, accept the default **%** or select the unit of measure that you need.
 - d. Type values for minimum, normal, and maximum concentration.
3. Click **OK**.

Define a Complex Analyzer

You use this procedure in the course of creating a complex analyzer tag. Before you perform this procedure, do the following:

- *Adding a New Line* (see "Add a New Line" on page 148)
 - *Managing Line Component Tables* (on page 164) for each line
 - *Defining an Instrument Type* (see "Define an Instrument Type" on page 83) of process function **Analyzer** for your complex analyzer
1. In the Process Data module, create a complex analyzer tag.
 2. In the **Complex Analyzer Tag Manager** dialog box, do the following for each stream tag that you want to define:
 - a. To the right of the **Analyzer stream** list, click **Add**.
 - b. In the **Add Tag Number** dialog box, type the number of the stream tag that you want to create.
 - c. In the dialog boxes that open, define properties as needed.

TIP Associate a line with the stream tag either in the **Tag Number Properties** dialog box or in the process data sheet for the given stream tag.
 3. For each stream that you added to the **Analyzer stream** list, do the following to create component tags that correspond to every component of the stream:
 - a. To the right of **Analyzer component/property**, click **Add**.
 - b. In the **Add Tag Number** dialog box, type the number of the component tag that you want to create.
 - c. In the dialog boxes that open, define properties as needed.
 4. In the **Complex Analyzer Tag Manager** dialog box, click **OK**.

Link Analyzer Stream Components with Line Components

Use this procedure to link analyzer component tags with line components. You must perform this procedure for every stream of a complex analyzer.

1. In the Process Data module, open the stream tag.
2. In the **GENERAL** section, from the **Line number** list, select the desired line.
3. In response to the prompt, click **Yes** to copy data from the line to the process data sheet.
4. In the **ANALYZER COMPONENT / PROPERTY** section, do the following for each tag in the **Analyzer/component** list:
 - a. Select the analyzer component tag.
 - b. From the **Line component** list, select the fluid component that you want to link with the analyzer component tag.
 - c. Enter values and units of measure in the **Repeatability**, **Accuracy**, **Minimum detection limit**, and **Range** fields as needed.
5. On the **Actions** menu, click **Save Process Data**.

Supplementary Service Operations

This section contains various topics on supplementary services used in the Process data module.

Add an Insulation Type

You can add a new insulation type if the desired one is not available in the **Insulation** list of the **ADDITIONAL LINE PROPERTIES** section of the **Line Process Data** window.

1. In the **Process Data Module** window, on the **Edit** menu, click **Insulation Types**.
2. In the **Insulation Types** dialog box, click **New** to add a new data line, where you type the new insulation type name and description.
3. Click **OK**.

Edit/Enter a Pipe or Orifice Material

This option enables you to enter additional pipe and orifice materials as well as modify the existing ones. You can select the desired ANSI group and enter or modify the linear expansion coefficients. It is possible to define linear expansion coefficients in different ways:

- One linear expansion coefficient for all temperatures.
- One linear expansion coefficient with a limitation on the minimum temperature (Tmin) or maximum temperature (Tmax).
- Two linear expansion coefficients and border temperature. This option allows you to use the first linear expansion coefficient for temperatures lower than the border temperature and the second linear expansion coefficient for temperatures higher than the border temperature.
- Two linear expansion coefficients, border temperature, and minimum/maximum temperature. This option allows you to use the first linear expansion coefficient for temperatures between minimum and border temperature and the second linear expansion coefficient for temperature between border and maximum temperature.

NOTE This option is also available in the Calculation module.

1. In any Process Data module window, on the **Edit** menu, click **Pipe/Orifice Material**.

2. In the data window, click fields that you want to edit, and type or select the desired values from the lists.
3. To enter a new material, click **New**, and then type or select the desired value from the respective lists.
4. To delete a material, select the desired data row and click **Delete**.
5. Click **OK** to apply changes and close this dialog box.

Define/Modify Pipe Specs

Pipe spec is a specification that defines various process conditions for a specific pipe.

Use this procedure to define a pipe spec to the **Pipe Specs** supporting table from the Process Data module, or to modify properties of an existing pipe spec.

1. In the **Process Data Module** window, click  to open the **Select Line** dialog box.
2. From the **Line type** list, select a line type.
3. Click **New** to open the **Line Properties** dialog box.
4. Beside the **Pipe spec** list, click  to open the **Pipe Specs** dialog box.
5. Do one of the following:
 - To create a new pipe spec, click **New** and type entries in the **Pipe Spec** and **Description** boxes.
 - To edit an existing pipe spec, click a field in a highlighted row and modify the existing entry as needed.

Delete a Pipe Spec

Use this procedure to delete a pipe spec from the **Pipe Specs** supporting table.

NOTE You cannot delete a pipe spec that is currently assigned to lines. First edit the lines to which the pipes spec that you want to delete is assigned.

1. In the **Process Data Module** window, click  to open the **Select Line** dialog box.
2. From the **Line type** list, select a line type.
3. Click **New** to open the **Line Properties** dialog box.
4. Beside the **Pipe spec** list, click  to open the **Pipe Specs** dialog box.
5. Select the pipe spec that you want to delete, and click **Delete**.
6. Repeat the previous step for each pipe spec that you want to delete.

Set the Default Units of Measure

This option enables you to set the desired default units of measure for the currently active <unit>. The units of measure and accuracy will appear on the process data or calculation sheets and the specification forms of the selected tags. Remember that you have to set default units of measure and accuracy separately for **each** <unit> in the <plant>.

1. In the main **Process Data** window, on the **File** menu, click **Units of Measure and Accuracy**.
2. For each desired parameter, select from the appropriate lists:
 - a. The level of accuracy.
 - b. The unit of measure, if applicable.
 - c. Type the appropriate default values for Ambient Temperature, Base Temperature, Barometric Pressure, and Base Pressure.

3. Click **OK**.

Calculate Liquid Density According to the API 2540 Standard

This feature enables you to calculate liquid density at operating and base conditions in accordance with the API 2540 standard. You can select one of the five product groups:

- Crude Oils and JP 4.
 - Jet Fuels, Kerosene, and Solvents.
 - Gasoline and Naphthenes.
 - Lubricating Oils.
 - Diesel Oil, Heating Oils, and Fuel Oils.
1. Open the process data sheet for an instrument tag from the Process Data module or the Calculation module.
 2. In the process data sheet, make sure that the **Liquid** fluid state is selected.
 3. Select the **API 2540** option from the **Fluid name source** list.
 4. Select the desired product group from the **Fluid name** list.
 5. In the **API 2540 STANDARD** section, select one of the following:
 - Density at reference temperature.
 - Specific gravity at reference temperature.
 - API settings for: minimum / normal / maximum
 6. Enter the desired values in the appropriate fields according to the selected option.
 7. If you selected **Density at reference temperature** or **Specific gravity at reference temperature**, do one of the following:
 - Type the reference temperature value in the **Reference temperature** field.
 - Click **Default** to enter the default reference temperature.
 8. Click **Calculate Density** to calculate the density.

TIP The calculated values for density and specific gravity are entered in the properties **@Minimum**, **@Normal**, and **@Maximum** fields.

Convert Engineering Units Automatically

Three steps convert one engineering unit to another: first, click the designated **Units** field drop-down list. Then, select the new unit of measure. Finish by choosing the new unit of measure. After the calculations are over, the results are displayed in the property record item fields.

NOTE When converting from one engineering unit to another, the data value changes in accordance with the new engineering unit.

1. With a process data sheet open, on the **Options** menu, click **Automatic Unit Conversion**.
2. Click in the **Units** field of the engineering units you want to convert and select the new engineering unit of measure.

TIP If you convert to Volumetric Flow engineering units, a dialog box opens where you specify the measuring condition.
3. Select a condition, and click **OK** to display the results.

TIP If you convert to engineering units other than Volumetric Flow, results are directly displayed in the property record item fields.
4. When finished, click  to save the changes.

Copy Default Units of Measure from Another <Unit>

You can define the default units of measure and accuracy by copying the definitions from another existing unit. You can then make any modification. This shortens the process of setting new default units of measure.

1. In the **Units of Measure and Accuracy** dialog box, click **Copy From**.
2. In the **Open** dialog box, navigate to the source <unit> from which you want to copy the default data.
3. Click **OK** to copy the default unit of measure settings.

Import Process Data Files

You can import process data sheets for lines or instruments in .ipd (SmartPlant Instrumentation process data) format after editing in the Process Data Editor, provided the line or instrument exists in the SmartPlant Instrumentation database. The .ipd format allows you to include multiple tags in a single file.

NOTE Use this procedure to import back into SmartPlant Instrumentation process data for a tag that already exists in your SmartPlant Instrumentation database.

Import Instrument Process Data Files

1. In the **Process Data Module** window, on the **Actions** menu, click **External Process Data**.
2. Under **Item type**, select **Instrument**.
3. Under **Action**, select **Import**.
4. Click **Open**.
5. In the dialog box that opens, navigate to the folder from which you want to import the file.
6. Select the desired file and click **Open**.

TIP The software only accepts .ipd files that contain instrument data.

7. Under **Search results**, select the **Select** check box beside the instruments that you want to import.

TIP The software only displays instruments that already exist in your SmartPlant Instrumentation database.

8. Click **Apply** or **OK**.

Import Line Process Data Files

1. In the **Process Data Module** window, on the **Actions** menu, click **External Process Data**.
2. Under **Item type**, select **Line**.
3. Under **Action**, select **Import**.
4. Click **Open**.
5. In the dialog box that opens, navigate to the folder from which you want to import the file.
6. Select the desired file and click **Open**.

TIP The software only accepts .ipd files that contain line data.

7. Under **Search results**, select the **Select** check box beside the lines that you want to import.

TIP The software only displays lines that already exist in your SmartPlant Instrumentation database.

8. Click **Apply** or **OK**.

Export Process Data Files

You can export process data sheets for lines or instruments in .ipd (SmartPlant Instrumentation process data) format for use with the Process Data Editor. In this way, you can allow an external party (contractor, engineering company, and so forth) to modify your process data outside of SmartPlant Instrumentation. The .ipd format allows you to include multiple tags in a single file.

Export Instrument Process Data Files

1. In the **Process Data Module** window, on the **Actions** menu, click **External Process Data**.
2. Under **Item type**, select **Instrument**.
3. Under **Action**, select **Export**.
4. Click **Find**, and in the **Find Tag** dialog box, under **Search parameters**, from the **Process function** list, select a process function other than **General**, and then click **Find**.
5. Select one or more of the tag numbers displayed, or click **Select all**.
6. Click **OK**.
7. In the **External Process Data** dialog box, under **Search results**, select the **Select** check box beside the instruments that you want to export, and click **Apply** or **OK**.
8. In the dialog box that opens, navigate to the folder to which you want to export, type a filename, and click **OK**.

Export Line Process Data Files

1. In the **Process Data Module** window, on the **Actions** menu, click **External Process Data**.
2. Under **Item type**, select **Line**.
3. Under **Action**, select **Export**.
4. Click **Find**, and in the **Select Line for Export** dialog box, do one of the following:
 - From the **Line Type** list, select a line type.
 - Select the **Show all line types** check box.
5. Select one or more of the lines displayed, or click **Select all**.
6. Click **OK**.
7. In the **External Process Data** dialog box, under **Search results**, select the **Select** check box beside the lines that you want to export, and click **Apply** or **OK**.
8. In the dialog box that opens, navigate to the folder to which you want to export, type a filename, and click **OK**.

Process Data Reports and Revisions

SmartPlant Instrumentation generates process data reports by utilizing eight pre-defined report templates with which the data of a SmartPlant Instrumentation item is associated (one for line, and seven for instruments). A SmartPlant Instrumentation item may be an Instrument or a Line. This is done through the association of a SmartPlant Instrumentation item, (and its process function - if it is an instrument) to its pre-defined template.

Each report is made up of a number of sections depending on the process function. For example: General, Quality of Fluid, Operating Data, Instrument Data, Properties Flow, Alarm and Trip Settings (for example, pressure & temperature instruments), a Notes field, and Internal and External Revision fields.

Generate a Process Data Report for One Instrument or Line

You can generate a process data report from an open process data sheet for the current instrument or line only.

NOTE If you are generating a report for a multi-case instrument tag, this option prints the current case.

1. Do one of the following:
 - Open a process data sheet for an instrument.
 - Open a process data sheet for a line.
2. On the **Actions** menu, click **Report**.
3. If you open a print preview, do any of the following:
 - Click  to select a pre- set magnification, or enter a customized one to fit your needs.
 - Click  to print the report, or  to print all available reports. Selecting the **Printer Setup** option from the **File** menu will allow you to select the default printer.
 - Click  to save the report as an external file.
 - Click  to create or edit local revisions and drawing numbers.

NOTE If the selected instrument (tag) has multiple lines associated with it, the data of the downstream line selected (in the tag process data from which the report was generated) will appear in the report. If none are selected, the report will look like a single-line tag report.

Generate Line Reports

This option allows you to generate process data reports for more than one line and case.

1. In the **Process Data Module** window, on the **Reports** menu, point to **Line**, and do one of the following:
 - To print one process line per page, click **Single Line**.
 - To print three process lines per page, click **Three Lines**.

TIP For lines that are multi- case, this option prints the governing case.
2. In the **Select Line for Report** dialog box, do one of the following:
 - From the **Line Type** list, select a line type.
 - Select the **Show all line types** check box.
3. Select the lines you want to include in the report.

4. Click **OK**.

Generate Instrument Reports

This option allows you to generate process data reports for more than one instrument and case.

1. Start the Process Data module.
2. In the **Process DataModule** window, on the **Reports** menu, point to **Instrument**, and do one of the following:
 - To print one tag per page, click **Single Tag**.
 - To print three tags per page, click **Three Tag**.

TIP For tags that are multi-case, this option prints the governing case.
3. In the **Find Tag** dialog box search for the tag number according to the criteria you specify, or click **Find** for a list that you can choose from.
4. Select the tags to include in the report.

TIP For multi-case tags, select each case that you want to include in the report.
5. Click **OK**.

View and Edit Process Data Revisions

You use revisions to keep track of the changes made to your process data. It is important and useful to have a chronological description of the changes, dates of change, and a list of persons who approved them. You can add, edit, and delete revisions. The Process Data module shares the following two types of revisions with the rest of SmartPlant Instrumentation: local revisions and global revisions. There is an additional type of revision available only in the Process Data module, which is an external revision.

NOTE If the process data workflow control has been enabled, only users with access rights are able to edit the Process Data Revisions. For more details, see *Workflow* (on page 54).

Work with External Process Data Revisions

Use this procedure to add, edit, or delete external revisions in the Process Data module.

1. In the **Process Data Module** window, do one of the following:
 - Click .
 - On the **Actions** menu, click **External Revisions**.
2. In the **Revisions** dialog box, select one of the revision numbering methods (use P0, P1, P2... for preliminary revisions or 0, 1, 2 /A, B, C, and so forth for normal serial revisions).

TIP When you first select a revision numbering method, several options are available to you, including preliminary revisions (designated by **P0, P1, P2...**). Once you select one of the other revision methods, you will not be able to return to the preliminary revision method and this option will be disabled.
3. Click **New** to add a new revision or click in a data field to update existing revision data in that field.
4. Add or edit the revision data in the appropriate data fields.

TIP The **By** data field contains the current user's initials by default, if previously defined by the SmartPlant Instrumentation System Administrator. You can also edit this field if desired.
5. To delete revisions, do the following:
6. Select the revision you want to delete.

7. Click **Delete**.

TIP As a time saver and a forget-me-not precaution, take advantage of using a default Revision method. The software automatically adds a new line with the next logical character and date each time you click **New** after you select the initial method.

8. When done, click **OK**.

NOTE If the process data workflow control has been enabled, only users with access rights are able to edit the Process Data Revisions. For more details, see *Workflow* (on page 54).

View Process Data History

SmartPlant Instrumentation can indicate process data changes by comparing current data with the data stored in the audit trail repository for the date range that you specify. You can choose any or all of the following modes of emphasis:

- You can set a color to emphasize changes on the screen.
- You can set a shade of gray to emphasize the changed data in printed reports and their previews.
- You can set bold and italic font style for emphasis on the screen and in print.

NOTE History indication is available only if the System Administrator has activated the audit trail functionality. When the audit trail functionality is activated, each time that you save data after making changes, the data is recorded in the audit trail repository.

1. In the Process Data module, open the desired tag.
2. On the **Options** menu, click **History Options**.
3. Select the date range for data history comparison, by doing one of the following:
 - In the **From** and **To** data fields, type the appropriate dates.
 - Select the appropriate dates using the spinner.
- TIP** To set the **To** data field value as today's date, click **Today**.
4. To set a font style to emphasize changes on the screen and in print, do one or both of the following:
 - Select **Bold**.
 - Select **Italic**.
5. To change the color used to display changes on the screen:
 - a. Beside the **Highlight color for display** box, click .
 - b. In the **Color** dialog box, choose the color that you require.
 - c. Click **OK** to save your new color settings and return to the **History Options** dialog box.
6. To change the shade of gray used to emphasize the changed data in printed reports and their previews:
 - a. Beside the **Grayscale for printing** box, click .
 - b. In the **Grayscale** dialog box, slide the bar to the desired position.
 - c. Click **OK** to save your new grayscale setting and return to the **History Options** dialog box.
7. Click **OK** to save your current history options and close the **History Options** dialog box.
8. On the **Options** menu, click **Mark Changes** to mark changes in the current process data sheet for the dates that you specified in the **History Options** dialog box. Clear the check box to clear all history indications in the current process data sheet.

NOTE To refresh the history indication in an open process data sheet, on the **Options** menu, clear **Mark Changes** and then select the option again.

Calculations

Calculation data originates mainly from the Process Data module, but also from the Instrument Index module. You can open the relevant dialog box for the specified instrument type (control valve, flowmeter, relief valve, or thermowell), enter all the parameters required for calculation, and initiate the calculation. After performing the calculation, the relevant data may then be incorporated into generated reports and specifications.

The Calculation module allows you to quickly perform calculations for Cv, noise, orifice diameter, required discharge area, and other parameters for control valves, flowmeters, relief valves, and thermowells.

The Calculation module employs the major international standards (ISA, ANSI, API, ISO, and IEC 60534-2-1 (1998)), to perform complex calculations quickly and effortlessly.

NOTES

- The software does not support calculations for materials for which the state is solid/powder, nor for 2-phase flow.
- If you need to add or modify process data, you can do this in the Calculation module (for details, see *Editing Instrument Process Data* (see "Edit Instrument Process Data" on page 142)).

Start the Calculation Module

This procedure explains how to start the calculation module.

NOTE Before starting this module, check with the Domain Administrator to ensure that you have been granted appropriate access rights for the tasks you will carry out.

Start the Calculation Module

- In any SmartPlant Instrumentation window, do one of the following:
 - On the SmartPlant Instrumentation toolbar, click .
 - Click **Module > Calculation**.

Preparing Process Data Calculation

Before running a calculation, use the Process Data Sheet to prepare a calculation item. When opening a tag in a process data sheet, you are required to define the fluid for which a calculation will be carried out. You define the fluid by selecting the fluid state, entering the fluid name or selecting it from one of the two property databases, and setting the fluid phase.

NOTES

- You can also select a batch of instruments of a given process function for calculation (for details, see *Multiple Process Data Cases* (see "Perform a Batch Calculation" on page 185)).
- If this is a new tag that you just created in the Calculation module, the **PROPERTIES** section of the window will be blank until you select the required **Fluid state**.
- The software does not support calculations for materials for which the state is **Solid/Powder**, **N/A** or **other** nor for 2-phase flow.

Open a Process Data Sheet for Calculation

Use this procedure to open individual control valve, flowmeter, relief valve, and thermowell process data sheets for calculation.

1. In the **Calculation Module** window, click **Edit > Calculation**, and then click one of the following:
 - **Flowmeter**
 - **Thermowell**
 - **Control Valve**
 - **Relief Valve**
2. On the **Enter Tag Number** dialog box, do one of the following:
 - Type the tag number that you want to calculate.
 - Click **Find** to open the **Find Tag** dialog box, where you search for the tag that you want to calculate.
3. Click **OK** to display the calculation **Process Data** window for the instrument that you selected.
4. If you defined multiple process cases, from the **Case** list, select the case that you want to calculate.

Define the Fluid (Calculation module)

This procedure is used to define the fluid for which a calculation will be carried out

1. Open the process data sheet for an instrument tag from the Process Data module or the Calculation module.
 2. If you defined multiple process cases, from the **Case** list, select the case that you want to calculate.
 3. In the **GENERAL** section of the process data sheet, from the **Fluid state** list, do one of the following:
 - Accept the fluid state that you set when you first opened the tag in the Process Data or Calculation module.
 - Select a different fluid state.
- NOTE** If you select **N/A or other**, the **Calculate**, **Report** and **Highlight** options are all disabled.
4. From the **Fluid name source** list, select one of the following options, which the software uses to calculate the item properties:
 - **Database** — Activates the Fluid Properties database after selecting the required fluid from the **Name** list (for details, see *Calculating Physical Properties* (see "Calculate the Properties of a Selected Material" on page 146)).
 - **API2540** — Calculates liquid density at operating and base conditions in accordance with the API2540 standard. To learn how to use the **API 2540 Standard Properties** database, see *API 2540 Standard for Liquid Density Calculation* (see "Calculate Liquid Density According to the API 2540 Standard" on page 168)).
 - **User-defined** — Allows you to define the fluid properties according to your own standards.
- TIP** If you selected **Solid/Powder** as the material state, the **Select from** list does not appear.
5. In the **Fluid name** box, enter the fluid name.
 6. From the **Fluid phase** list, select the required fluid phase.

Performing Standard Calculations

The calculation dialog boxes comprise the essence of the Calculation module. The values that you enter in these dialog boxes together with the data in the process data sheets serve as the basis of the calculations displayed on the screen. Calculation item reports provide information that is more comprehensive.

TIP When you open a **Calculation Item** window and some of the process data values are not filled in, you can click **Highlight Process Data** on the **Options** menu to highlight all the fields that you must fill in to carry out the calculation.

Prepare for Flowmeter Calculation

Use this procedure to enter the values common to all three types of flowmeter calculation.

When you reach the last step of the current procedure, click the link to the procedure that you require to complete the calculation.

NOTES

- By default, SmartPlant Instrumentation updates tag values from the current unit of measure to their value in a new unit of measure that you set. If on the **Options** menu you clear **Automatic Unit Conversion**, the software changes the unit of measure without recalculating the values. Therefore, to protect the integrity of your values, on the **Options** menu, click **Automatic Unit Conversion**.
 - To highlight the fields that are required for a calculation, on the **Options** menu, click **Highlight Process Data**.
1. Open a calculation data sheet for the flowmeter tag that you want to calculate.
 2. If you defined multiple process cases, from the **Case** list, select the case that you want to calculate.
 3. Make sure that you enter process data in all of the fields in the data sheet that are required for calculation.
 4. On the module toolbar, click .
 5. Do one of the following:
 - On the module toolbar, click .
 - Click **Actions > Calculate**.
 6. In the **Flowmeter Calculation** dialog box, continue with one of the following procedures:
 - Orifice flowmeter calculation
 - Tube flowmeter calculation
 - Restriction device calculation

Calculate Orifice Flowmeter Parameters

This option enables you to calculate orifice flowmeter parameters based on the fluid state values of the flowmeter and values retrieved from the Process Data module. In a calculation data sheet for a flowmeter item, you can accept or modify these values, or enter additional values. Then, in the **Flowmeter Calculation** dialog box, you calculate orifice flowmeter parameters for a selected orifice flowmeter and view the calculation results.

1. Open the **Flowmeter Calculation** dialog box for the orifice flowmeter that you want to calculate.
2. From the **Flowmeter type** list, select the required orifice flowmeter.

TIP The **Quarter of Circle Orifice** (also known as **Quadrant Edge Orifice**) sizing is in accordance with the new edition of British Standard (BS 1042: Section 1.2; 1989).

3. From the **Sub type** list, select the required sub type for the current orifice flowmeter.
4. Type the required values in the fields next to the other two calculation options that you have not selected. SmartPlant Instrumentation will then use these values to calculate the tube flowmeter parameters for the selected option.
5. Under **Pipe**, view the data in the **Material** field and the **Linear expansion coefficient** field.

TIPS

- The data in the **Pipe material** field is retrieved from the Process Data module.
- The linear expansion coefficient value for the displayed pipe is the standard value taken from SmartPlant Instrumentation database.
- From the **Linear expansion coefficient** list of units of measure, you can select a required unit of measure for the current linear expansion coefficient.

6. Under **Orifice**, from the **Orifice material** list, select the orifice material.

TIPS

- The **Orifice material** list contains standard options provided with SmartPlant Instrumentation. If the required orifice material is not in the list, select from the list the **MATERIAL NOT LISTED** option and in the **Linear expansion coefficient** field type the required linear expansion coefficient.
- If you select a standard option from the **Orifice material** list, you cannot change the linear expansion coefficient value for the displayed orifice material because this is the standard value taken from SmartPlant Instrumentation database.

7. In the **Diameter of bleed/vent hole** field, type the required diameter of the bleed/vent hole or accept the given value.

TIPS

- When calculating the orifice flowmeter parameters for the **Steam** fluid state, in the **Water in steam, %wt** field, type the percentage of water in steam.
- If the value in the **Full scale flow** field has been changed, you can click  to get the values from the Process Data module.

8. Under **Select calculate field**, select one of the following options to calculate the orifice flowmeter parameters:
 - **Orifice diameter**
 - **Full scale flow**
 - **Differential range**
9. Click **Calculate**.

NOTE Calculation is disabled for **N/A or other** fluid state.

10. Examine the calculation results and possible calibration error messages.

TIPS

- The units of pressure loss derive from the default units for Differential Range (Flow) set in the **Units of Measure and Accuracy** dialog box.
 - When sizing flowmeters for Liquids and Water, SmartPlant Instrumentation checks whether **Downstream pressure** is greater than **Vapor pressure**. If it is, the program continues sizing. If it is not, critical flow takes place, and the program advises you to check the input data.
11. To recalculate the orifice flowmeter parameters, enter the new data and click the **Calculate** command button.
 12. Click **Close** to return to the calculation data sheet.

Calculate Tube Flowmeter Parameters

This option enables you to calculate tube flowmeter parameters based on the fluid state values of the flowmeter and the values retrieved from the Process Data module. In a calculation data sheet for a flowmeter item, you can accept or modify these values, or enter additional values. Then, in the **Flowmeter Calculation** dialog box, you calculate the tube flowmeter parameters for a selected tube flowmeter, view and print out the calculation results.

1. Open the **Flowmeter Calculation** dialog box for the tube flowmeter that you want to calculate.
2. From the **Flowmeter type** list, select the tube flowmeter type.
3. From the **Sub type** list, select the tube flowmeter sub-type, if available.
4. Type the required values in the fields next to the other two calculation options that you have not selected. SmartPlant Instrumentation will then use these values to calculate the tube flowmeter parameters for the selected option.
5. In the **Tube** group box, view the data in the **Material** field and the corresponding linear expansion coefficient value in the **Linear expansion coefficient** field.

TIPS

- The data in the **Material** field is retrieved from the Process Data module.
 - The linear expansion coefficient value for the displayed pipe is the standard value taken from the SmartPlant Instrumentation database.
 - From the **Linear expansion coefficient** list of units of measure, you can select a required unit of measure for the current linear expansion coefficient.
6. In the **Throat** group box, select the required throat material.

TIPS

- The **Material** list contains standard options provided with SmartPlant Instrumentation. If the required throat material is not in the list, select from the list the **MATERIAL NOT LISTED** option and in the **Linear expansion coefficient** field type the required linear expansion coefficient.
- If you select a standard option from the **Material** list, you cannot change the linear expansion coefficient value for the displayed throat material because this is the standard value taken from the SmartPlant Instrumentation database.
- When calculating the tube flowmeter parameters for the steam fluid state, in the **Water in steam, %wt** field, type the percentage of water in steam.

- If the value in the **Full scale flow** field has been changed, you can click  to retrieve the values from the Process Data module.
7. Under **Select calculate field**, select one of the following options to calculate the tube flowmeter parameters:
 - **Throat diameter**
 - **Full scale flow**
 - **Differential range**
 8. Click **OK** to carry out and display the calculation results.
 9. Examine the calculation results and possible calibration error messages.

TIPS

- The values of pressure loss in the results comes from the default values for differential range flow set in the **Units of Measure and Accuracy** dialog box.
 - When sizing flowmeters for Liquids and Water, the software checks whether **Downstream pressure** is greater than **Vapor pressure**. If it is, the program continues sizing. If it is not, critical flow takes place, and the program advises you to check the input data.
10. To recalculate the tube flowmeter parameters, enter the new data and then click **Calculate**.
 11. Click **Close** to return to the calculation data sheet, where you can click  to generate a report for the current calculation result. Error messages also appear in a calculation report.

Calculate the Restriction Device Parameters

This option enables you to calculate the restriction device parameters based on the fluid state values of a flowmeter and values retrieved from the Process Data module. In a calculation data sheet for a flowmeter item, you can accept or modify these values, or enter additional values. Then, in the **Flowmeter Calculation** dialog box, you calculate the restriction device parameters and view the calculation results.

1. Open the **Flowmeter Calculation** dialog box for the restriction device that you want to calculate.
2. From the **Flowmeter type** list, select **Restriction Device**.
3. From the **Sub type** list, select the restriction device sub type.
4. Type the appropriate values in the fields next to the other two calculation options that you have not selected. SmartPlant Instrumentation will then use these values to calculate the tube flowmeter parameters for the selected option.
5. In the **Pipe** group box, view the data in the **Material** field and the corresponding linear expansion coefficient value in the **Linear expansion coefficient** field.

TIPS

- The data in the **Pipe material** field is retrieved from the **Process Data** module.
- The linear expansion coefficient value for the displayed pipe is the standard value taken from the SmartPlant Instrumentation database.
- From the **Linear expansion coefficient** list of units of measure, you can select a required unit of measure for the current linear expansion coefficient.

6. In the **Orifice** group box, from the **Material** list, select the orifice material of the restriction device.

TIPS

- The **Orifice material** list contains standard options provided with SmartPlant Instrumentation. If the required orifice material is not in the list, select from the list the **MATERIAL NOT LISTED** option and in the **Linear expansion coefficient** field type the required linear expansion coefficient.
 - If you select a standard option from the **Material** list, you cannot change the linear expansion coefficient value for the displayed orifice material because this is the standard value taken from the SmartPlant Instrumentation database.
7. In the **Diameter of the bleed/vent hole** field, accept the displayed value, or type the diameter of the bleed/vent hole.
 8. If needed, clear the **Calculate discharge coefficient** check box to enable you to type the discharge coefficient.

TIPS

- If you leave the **Calculate discharge coefficient** check box selected, the software automatically calculates the discharge coefficient according to the preset values.
 - When calculating the restriction device parameters for the **Steam** fluid state, in the **Water in steam, %wt** field, type the percentage of water in steam.
 - If the value in the **Full scale flow** field has been changed, you can click  to get the values from the Process Data module.
9. Under **Select calculate field**, select one of the following options to calculate the restriction device parameters:
 - **Orifice diameter**
 - **Full scale flow**
 - **Pressure loss**

CAUTION Do not type any values in the field next to the selected calculation option.

10. Click **OK** to carry out and display the calculation results.
11. Examine the calculation results and possible calibration error messages.

TIPS

- The values of pressure loss in the results comes from the default values for differential range flow set in the **Units of Measure and Accuracy** dialog box.
 - When sizing flowmeters for Liquids and Water, SmartPlant Instrumentation checks whether **Downstream pressure** is greater than **Vapor pressure**. If it is, the program continues sizing. If it is not, critical flow takes place, and the program advises you to check the input data.
12. To recalculate the restriction device parameters, enter the new data and then click **Calculate**.
 13. Click **Close** to return to the calculation data sheet, where you can click  to generate a report for the current calculation result. Error messages also appear in a calculation report.

Calculate the Sizing of a Relief Valve

Use this procedure to calculate the size of a relief valve. This option works for single phase fluids only and for all fluid states, with the exception of **Solid/Powder** and **N/A or other**.

NOTES

- By default, SmartPlant Instrumentation updates tag values from the current unit of measure to their value in a new unit of measure that you set. If on the **Options** menu you clear **Automatic Unit Conversion**, the software changes the unit of measure without recalculating the values! Therefore, to protect the integrity of your values, on the **Options** menu, click **Automatic Unit Conversion**.
- To highlight the fields that are required for a calculation, on the **Options** menu, click **Highlight Process Data**.

1. Open a calculation window for a relief valve item.
2. If you defined multiple process cases, from the **Case** list, select the case that you want to calculate.
3. Make sure that you enter process data in all of the fields in the data sheet that are required for calculation.

TIP Although from the **Pressure/Vacuum** list, you can select **Vacuum only** or **Pressure and vacuum**, SmartPlant Instrumentation calculates pressure relief valves only, and not vacuum relief valves or dual mode pressure/vacuum relief valves. The vacuum service set point value that you enter beside **Valve Set Vacuum** is displayed in the process data report for this instrument, but not in the calculation report.

4. Click .
5. Click  to display the **Relief Valve Calculation** dialog box.

TIP The default selection for **Use Rupture Disk at the inlet?** is **No**. Selecting **Yes** enables the **Combination Capacity factor(Kc)** field below.

6. Select user-defined conditions for the relief valve:
 - ASME Capacity Certification requirement.
 - Sizing basis.
 - Rupture Disk at the inlet use.
7. If you are using the Bellows valve style in liquid or water applications, you can also let SmartPlant Instrumentation calculate the correction factor for back pressure (Kw) by checking the **Calculate** check box.
8. Type the required value for **Effective coefficient of discharge (Kd)** or click **Default** to use the SmartPlant Instrumentation default value.
9. If available, type the required value for **Combination capacity factor (Kc)** or click **Default** to use the SmartPlant Instrumentation default value.
10. Click the **Calculate** command button.
11. Click **Close** to return to the calculation data sheet.

Calculate Sizing of a Relief Valve in Case of Fire

Use this procedure to calculate the size of a relief valve in case of fire.

NOTES

- By default, SmartPlant Instrumentation updates tag values from the current unit of measure to their value in a new unit of measure that you set. If on the **Options** menu you clear **Automatic Unit Conversion**, the software changes the unit of measure without recalculating the values. Therefore, to protect the integrity of your values, on the **Options** menu, click **Automatic Unit Conversion**.
 - To highlight the fields that are required for a calculation, on the **Options** menu, click **Highlight Process Data**.
1. With a calculation data sheet open for a relief valve item, scroll to the **SIZING DATA** section.
 2. From the **Case (fire/non-fire)** list, select **Fire**.
 3. Enter all the required values, especially the Area and Properties @relieving condition values. Some properties vary for the Liquid and Gas fluid states.
 4. Complete the **Relief Valve Calculation** dialog box, and click the **Calculate** command button to get the calculation results.

NOTE Calculation is disabled for **N/A or other** fluid state.

TIP The Sizing basis and other calculation results (the Calculated area, Selected area, and Orifice designation) appear on specifications based on SmartPlant Instrumentation library form # 7.

Calculate a Control Valve

This procedure enables you to enter various values for calculating a control valve. First, you define a CV calculation method and a flow coefficient standard (US or Europe) of CV sizing, then you select a noise calculation method and a CV body type. Next, you enter values, perform the calculation, and view the results.

NOTES

- By default, SmartPlant Instrumentation updates tag values from the current unit of measure to their value in a new unit of measure that you set. If on the **Options** menu you clear **Automatic Unit Conversion**, the software changes the unit of measure without recalculating the values. Therefore, to protect the integrity of your values, on the **Options** menu, click **Automatic Unit Conversion**.
 - To highlight the fields that are required for a calculation, on the **Options** menu, click **Highlight Process Data**.
1. Open a control valve calculation item.
 2. If you defined multiple process cases, from the **Case** list, select the case that you want to calculate.
 3. Make sure that you enter process data in all of the fields in the data sheet that are required for calculation.
 4. Click  to save the values.
 5. Do one of the following:
 - On the module toolbar, click .
 - Click **Actions > Calculate**.

NOTE Calculation is disabled for **N/A or other** fluid state.

6. In the **Control Valve Calculation** dialog box, from the **Calculation method** list, select the required calculation method, that is, **ISA** or **IEC**.
TIP The IEC standard is 60534- 2-1 (1998)
7. From the **Flow coefficient** list, select the required flow coefficient standard of CV sizing (**Cv** or **Kv**).
TIP Kv is a European standard flow coefficient available for an IEC CV calculation method.

$$Kv = Cv * 0.865$$
8. Based on the value that you selected from the **Fluid state** list on the process data sheet, do one of the following:
 - If you set **Liquid** or **Water**, select **Masoneilan** or **IEC** from the **Noise calculation method** list.
 - If you set **Gas/Vapor** or **Steam**, select **ISA** or **IEC** from the **Noise calculation method** list.
9. Enter hydrodynamic noise data as necessary.
TIP This option is available only if under **State** you selected **Liquid** or **Water**, and under **Noise Calculation Method** you selected **IEC**.
10. From the **Body type** list, select the required body type.
11. Enter the required critical flow factor values (F_I, C_f) at minimum, normal, and maximum control valve coefficients.
12. To define the required pressure drop ratio factor values (X_t) at minimum, normal, and maximum control valve coefficients, do one of the following:
 - To calculate the values automatically, as a function of critical flow, select **Calculate pressure drop ratio factor**.
 - Type the required values in the **@Minimum**, **@Normal**, and **@Maximum** fields.
13. Type the **Valve style modifier** (F_d) value.
14. To set the **Relative capacity** value, do one of the following:
 - Accept the value that SmartPlant Instrumentation calculates based on the calculation method and on the standard that you selected from the **Flow coefficient** list.
 - Type the value that you require.
15. Type the required **Number of flow passages**.
16. Enter the appropriate **Valve size** and select its unit of measure.
17. To set the outlet pipe diameter, do one of the following under **Outlet pipe diameter**:
 - Manually type the value required.
 - Copy the internal pipe diameter value from either the **Upstream line** or **Downstream line** by selecting the correlating radio button and clicking **Copy from**.
18. Click **Calculate** to carry out and display the calculation results.
19. Examine the figures for results that may have to be re-calculated.
20. To recalculate the control valve parameters, enter the new data and click the **Calculate** command button.
21. Click **Close** to return to the calculation data sheet.
TIP You can calculate a control valve and the relevant parameters even if the pipe wall thickness is not defined. In this case, **Noise** is not calculated and a line of text in Notes section of the calculation sheet informs you that Noise will not be calculated because Pipe wall thickness is not defined.

Calculate the Maximum Permissible Thermowell Length

A thermowell, inserted into a pipe, enables you to calculate tag temperature. This procedure shows you how SmartPlant Instrumentation calculates the maximum permissible length of a thermowell. The calculation is based on the maximum frequency that the thermowell can withstand. The calculation complies with ASME PTC 19.3 Standard.

NOTES

- By default, SmartPlant Instrumentation updates tag values from the current unit of measure to their value in a new unit of measure that you set. If on the **Options** menu you clear **Automatic Unit Conversion**, the software changes the unit of measure without recalculating the values. Therefore, to protect the integrity of your values, on the **Options** menu, click **Automatic Unit Conversion**.
 - To highlight the fields that are required for a calculation, on the **Options** menu, click **Highlight Process Data**.
1. Open a thermowell calculation item.
 2. If you defined multiple process cases, from the **Case** list, select the case that you want to calculate.
 3. Make sure that you enter process data in all of the fields in the data sheet that are required for calculation.
 4. Click  to save the values.
 5. Click  to open the **Thermowell Calculation** window.
 6. Select the appropriate velocity: **minimum**, **normal**, or **maximum**.
 7. Select the required values from the **Nominal size of sensing element** list.
 8. Enter additional values as need, and click **Calculate**.
 9. When done, click **Cancel** to return to the main calculation window for a temperature item.

SECTION 14

Special Calculations

This section contains topics about making calculations that are different from the regular calculations already described in the help.

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Perform a Batch Calculation

This option enables you to perform a calculation for a group of tags, all belonging to one of the following types: Control Valve, Flowmeter, Relief Valve, or Thermowell.

NOTES

- You must define process data before calculation.
 - After calculating tags, you can change parameters and then use this procedure to recalculate.
1. On the **Edit** menu, point to **Batch Calculation**, and click the required instrument type. SmartPlant Instrumentation opens the **Batch Calculation** window for instruments of that type.
 2. On the **Actions** menu, click **Find Tag**.
 3. In the **Find Tag** dialog box, under **Search parameters**, do one of the following:
 - Type and select filter parameters.
 - To display all tags, leave the boxes blank.
 4. Click **Find**.

TIPS

- For tags for which you defined multiple cases, each case is displayed in a separate row, which allows you to select one or more cases of a given tag for calculation.
 - To utilize the entire dialog box to display the results, click **Show more search results**.
5. Select the tags that you want to calculate, and click **OK**.
 6. In the **Batch Calculation** window, for each tag for which you want to display or edit calculation parameters, select the tag and do the following:
 - a. Click **Actions > Type Data**.
 - b. Type and select data you want to change for the calculation, and click **OK** to return to the **Batch Calculation** window.
 7. Select the tags that you want to calculate, and do one of the following:
 - Click **Actions > Calculate**.
 - On the module toolbar, click .

NOTE

If one of the selected tags has **N/A or other** set as **Fluid state**, calculation for that tag will fail with the following status: **Cannot calculate N/A**.

Additional available actions:

- For information on items with status **Failed**, on the **Reports** menu, click **Batch Calculation Messages**.

- To display process data for a specific tag in the **Batch Calculation** window, select a tag, and on the **Reports** menu click **Process Data Report**.
- To display calculation data for a specific tag in the **Batch Calculation** window, select a tag, and on the **Reports** menu click **Calculation Report**.

NOTE If the selected tag has **N/A or other** set as **Fluid state**, the calculation report does not open, and the following message is displayed: **There is no report data**.

- To launch the calculation window for a specific tag in the **Batch Calculation** window, select a tag, and on the **Edit** menu click **Calculation Data**.

NOTE If the selected tag has **N/A or other** set as **Fluid state**, the calculation window does not open, and the following message is displayed: **Cannot open calculation data for N/A or Other fluid state**.

Calculate Multiple Cases

A given instrument or line is often used for more than one operating service. For example, a dual-fuel control system might use a single supply line and control valve to carry various fuels, gas or liquid. Each group of process data settings that you enter for a given instrument or line is called a case. For more information, see *Multiple Process Data Cases* (on page 153).

Use this procedure to calculate multiple cases of a given tag.

1. In the Calculation module, create multiple cases for the tag that you want to calculate. For details, see *Creating Process Data Cases* (see "Create Process Data Cases" on page 153).
TIP You can create multiple cases in the Process Data module, and later open the tag in the Calculation module.
2. For each case that you want to calculate, do the following:
 - a. In the **GENERAL** section of the calculation data sheet, from the **Case** list, select the required case.
 - b. Calculate the case.
3. To generate a calculation report for the current case, on the **Actions** menu, click **Reports**.

Create a Hybrid Case

For a control valve for which you defined multiple cases, you can create a hybrid case from the minimum, normal, and maximum flow coefficient values (Cv/Kv) that you calculated for the various cases. Use this procedure to create such a hybrid case.

1. In the Process Data module or in the Calculation module, create multiple cases for the control valve for which you want to create a hybrid case. For details, see *Creating Process Data Cases* (see "Create Process Data Cases" on page 153).
2. Do one of the following to calculate every one of the cases:
 - In a **Control Valve Calculation** window for the given tag, calculate every one of the cases individually.
 - Perform a batch calculation procedure to select and calculate all of the cases of the given control valve tag.
3. In the main window of the Calculation module, click **Edit > Hybrid Case**.
4. On the **Select Tag** dialog box, click **Find**, and then select the tag for which you want to create a hybrid case.
5. On the **Hybrid Case** dialog box, do the following to set values for the hybrid case:
 - a. In the **Case selection** data window, select the value that you want to copy for the hybrid flow coefficient at minimum, and then click **Add Minimum**.

- b. In the **Case selection** data window, select the value that you want to copy for the hybrid normal flow coefficient, and then click **Add Normal**.
- c. In the **Case selection** data window, select the value that you want to copy for the hybrid flow coefficient at maximum and then click **Add Maximum**.

TIPS

- Flow coefficients are displayed dynamically as Cv or Kv, depending on the method of calculation that you set for a given control valve in the **Control Valve Calculation** dialog box.
- The software offers you the flexibility to select any value of a case for any level of the hybrid case — minimum, normal, or maximum.

Calculation Reports

These procedures are used for generating Calculation Reports.

Principles of Generating Calculation Item Reports

SmartPlant Instrumentation generates Calculation item reports by utilizing two predefined report templates: Liquid and Gas, with which the data of an instrument is associated. An instrument may be a Control Valve, Flowmeter, Relief Valve, or Thermowell. This is done through the association of an instrument, and its process function to its predefined template defined in the Process Data module.

Each report is made up of a number of sections depending on the process function. For example: the heading, information gathered from the Process Data module, data entered via the **Body Type** dialog box of the Calculation module, the **Results and Coefficients** section, and an area provided for Notes and Revisions.

CAUTION When generating a report, only those items that include the saved calculation results appear on the list in the **Find Tag** dialog box.

Generating Calculation Item Reports

Use this procedure to do the following:

- Generate calculation reports for instrument tags.
- Add, edit, and delete calculation report revisions.
- Assign, edit, and delete external drawing numbers assigned to the calculation reports.

Generate a Calculation Item Report

1. In the **Calculation Module** window, on the **Reports** menu, click the report that you require.
TIP You can also generate a calculation item report when a calculation item window is open. On the module toolbar click , or on the **Actions** menu, click **Report**.
2. In the **Find Tag** dialog box, under **Search parameters**, do one of the following:
 - Type and select filter parameters. For details, see *Use Search Parameters to Find Tag Numbers* (on page 30).
 - Leave the boxes blank to display all tags.
3. Click **Find**.
4. Select the tags for which you want to generate a report, and click **OK**.
5. At the prompt, click **Yes** to display the calculation item report print preview. You can do any of the following:
 - Adjust the zoom level.

- Save this report as an external file.
 - Perform, edit, or delete a revision on the calculation report.
 - Assign, edit or delete an external drawing number for the calculation report.
6. On the module toolbar, click .

Calculation Revisions

The revision feature is used to keep track of the changes made to SmartPlant Instrumentation reports and items, including calculations. It is important and useful to have a chronological description of the changes, dates of change, and a list of persons who approved them. Use this procedure to add, edit, and delete revisions.

Maintain Calculation Revisions

1. Generate a report preview for the calculation (for details, see *Generating Calculation Item Reports* (on page 187)).
2. In the **Print Preview: Calculation Report** window, on the print preview toolbar, click .
3. In the **Revisions** dialog box, select one of the revision numbering methods (use **P0**, **P1**, **P2...** for preliminary revisions or **0**, **1**, **2 / A**, **B**, **C** etc. for normal serial revisions).

TIPS

- When you first select a revision numbering method, several options are available to you, including preliminary revisions (designated by **P0**, **P1**, **P2...**). Once you select one of the other revision methods, you will not be able to return to the preliminary revision method and this option will be disabled.
 - If you select any revision method besides **Other**, SmartPlant Instrumentation successively numbers each new revision.
4. Click **New** to add a new revision data or click **Edit** to update an existing revision data line.
 5. Add or edit the revision data in the appropriate data fields.
TIP The **By** data field contains the current user's initials by default, if the System Administrator has defined it as such.
 6. Under **Drawing number**, accept the default drawing number, or edit as required.
 7. To delete revisions do the following:
 - a. Select the revision you want to delete.
 - b. Click **Delete**.
 8. Click **OK**.

NOTE You can also maintain revisions in batch mode using global revisions (for more information, see *Global Revisions* (on page 44)).

Create a New Tag in the Calculation Module

You can create new tag numbers directly in the Calculation module, without having to open the Instrument Index module.

1. In the **Calculation Module** window, on the **Edit** menu, point to **Calculate**, and then click one of the following:
 - **Flowmeter**
 - **Thermowell**
 - **Control Valve**
 - **Relief Valve**
2. On the **Enter Tag Number** dialog box, type the name of the new tag number, and click **OK**.
3. If the **Select Instrument Type** dialog box opens (because there is more than one record for a given instrument type acronym), select the required instrument type and click **OK**.
4. On the **Loop Name** dialog box, do one of the following:
 - Accept the displayed loop number and click **OK**.
 - Type the loop number that you need and click **OK**.
 - To create the tag number without a loop association, click **Cancel**.
5. On the **Tag Number Properties** dialog box, on the **General** tab, enter the appropriate values.
6. Enter power supply values. For details, see *Enter Power Supply Data for Panels and Instrument Tags* (on page 94).
7. If the **Process Data** dialog box opens, select a fluid state and then click **OK**.
8. In the process data sheet, enter and save the relevant process data values.

Recommended Control Valve Characteristic

This feature allows you to calculate the recommended control valve characteristic. You can determine whether Linear or Equal Percentage valve is more suitable for a specific valve application.

NOTE Make sure that you enter the required pressure drop, pump drop, and system loss values in the process data sheet before performing this procedure.

Calculate the Recommended Control Valve Characteristic

1. Open the required calculation item sheet for a control valve calculation.
2. On the **Actions** menu, click the **Recommended Valve Characteristic** option.
3. Enter the required **Critical** value or click **Default** to utilize the default value.
4. Click **Calculate**.

TIP SmartPlant Instrumentation calculates the recommended valve characteristic and displays the result (**Linear** or **Equal %**) both in this dialog box and the **Notes** window.

Entering Built-Up Back Pressure – Relief Valve

The option enables you to enter a built-up back pressure value, which is taken into account for calculation when sizing the relief valves. The result is displayed in the **NOTES** section of the calculation data sheet, under **General Notes**.

1. With a calculation data sheet open for a relief valve item, on the **Actions** menu, click **Enter Built-up Back Pressure**.
2. In the **Built-up Back Pressure** dialog box, type the required value, select the unit of measure and click **OK**.

SECTION 15

Specifications

The Specifications module provides the means to efficiently generate detailed specification documents (often referred to as Specs). This is helpful for engineering and ordering procedures and provides a useful permanent record for checking installed instruments. The Specifications module also incorporates data from the Instrument Index, Process Data, and Calculation modules into generated documents.

You can generate any type of specification (that is, single-tag instrument spec, composite spec, multi-tag spec, and so forth) in the Specifications module. Also, it is possible to generate single-tag instrument specs in the **Domain Explorer**. Note, however, that if you want to generate a spec in the **Domain Explorer**, you must first assign a specific spec form to the instrument type profile. A generated specification automatically appears in the **Domain Explorer**, under the items for which you generated the specification. You can open an existing spec either from the **Domain Explorer**, Specifications module, or Instrument Index Standard Browser view.

When printing a specification, we recommend that the print sheet size be either A4 or Letter. Note, however, that if the title block assignment method in the current domain is defined as **Standard (used in all modules)**, you need to adjust your title block before printing specs using the Letter size. For details, see *Spec Title Blocks* (on page 265).

Specifications Module Window

The **Specifications Module** window is the main window of the Specifications module, provides the means to efficiently generate detailed specifications for various item types. It opens when you click  on the toolbar or on the **Module** menu, click **Specifications**. You can have multiple open modules. The number of open modules depends on your computer resources.

Using the toolbar options and menu commands available in the **Specifications Module** window, you open other windows and dialog boxes where you perform various operations to define and manage you specifications.

The window consists of the following sections:

- **Menu bar** — Provides access to all the *Specifications Module Commands* (see "Specifications Module Window Commands" on page 192).
- **Application work area** — The area where other Specifications module windows and dialog boxes open.
- **Toolbar** — Provides access to the most common Specifications module commands.
- **Status bar** — Shows the current status or the pertinent Microhelp message, plant hierarchy items, and the current date and time.

Specifications Module Window Commands

This topic lists and describes menus and commands that are available in the **Specifications Module** window.

NOTE The **Reports** menu commands are available in **Specifications Module, <Item> Specification, Composite Specification, and Multi- Tag Instrument Specification** windows. For details of the available reports and their descriptions, see *Specification Report List* (on page 303).

Icon	Edit Menu Command	Description
	Page Editor	Allows you to edit existing pages or create new pages on the basis of existing pages. You can then associate spec pages with forms.
	Section Editor	Allows you to edit composite page sections you created in InfoMaker. You can then integrate sections with spec pages to define pages as composite.
	Form Editor	Allows you to create a new specification form or edit an existing one.
	Format Editor	Allows you to create or edit multi-tag specification formats.
	Spec Data Dictionary	Allows you to assign user-defined headers for Spec Form Field reports. Also, you can assign names to the data fields used in a form browser, select fields for a form browser, protect field headers from editing in the form data template, and so forth.
None	Form Data Template Editor	Allows you to manage form data templates.

Icon	Actions Menu Command	Description
	Open Specification	Allows you to open an existing specification or create a new specification for a specific item type that you select.
None	Save as Files	Opens a dialog box where you specify a target folder for saving instrument specifications in either .isf or .psr format, and then save one or more instrument specifications to the specified folder (only available when the specification item type is Instrument).
None	Save as Excel	Saves a batch of specifications in Excel format (only available when the specification item type is Instrument).
None	Import Data	Opens a dialog box where you import data from .isf files to instrument specifications in batch mode.
None	Title Block Styles	Adds a new customized title block to a specification form. This option is not available if the System Administrator, when making or modifying domain definitions, selected the Standard title block assignment method.

Icon	Actions Menu Command	Description
None	Associate Title Block	Associates a customized title block with a specification form. This option is not available if the System Administrator, when making or modifying domain definitions, selected the Standard title block assignment method.
None	Change Spec Forms	Changes the form associated with the selected specifications.
None	Change Master Tags	Redefines the master tag number of multi-tag specification.
None	Retrieve Custom Pages as PSR Files	Allows you to retrieve custom pages from the database and save them in a specified folder as .psr files.
None	Regenerate Library Forms	Allows you to rebuild all specification forms of the SmartPlant Instrumentation default library.
None	Regenerate Formats	Allows you to rebuild all multi-tag specification formats.
None	Spec Revisions	Opens a dialog box you use for viewing and printing revisions.
None	Manage Spec Revisions	Opens a dialog box where you save revisions to the database, in .psr format, or in .zip format.
None	Specification Views	Opens a dialog box where you associate specification views with the SmartPlant Instrumentation database.
None	Delete Form Data Template	Opens a dialog box where you delete a form data template.
None	Delete Specifications	Opens a dialog box where you delete specifications in batch mode.

Icon	Options Menu Command	Description
None	History Options	Opens a dialog box where you set specification history indication. History indication is only possible if the System Administrator has enabled the use of audit trail options in your domain. Enabling this option disables the Compare function available in the print preview.
None	Mark Changes	Marks the changes in the current specification for the dates you selected in the History Options dialog box. This option is available only if the System Administrator has enabled the use of audit trail options in the current domain. Enabling this option disables the Compare function available in the print preview.

SECTION 16

Principles of Generating Specifications

SmartPlant Instrumentation generates a specification based on a pre-defined spec form that you associate with the source item. Each form consists of one or more spec pages, which, in turn can contain one or more sections. A spec page that does not include sections you define in the **Section Editor** is considered a single-section page. A spec page that contains sections you define in the **Section Editor** is referred to as composite.

When you first create a specification for an item, you have to specify the form number to create the item-form association. On subsequent occasions, you only need to specify the item number to display the specification. It is only possible to generate a spec in the Specifications module. On generating a spec, the software automatically creates a unique document number for the spec.

Each specification is made up of data portions. For example: general data, process data, construction data, purchase data, a note field, and a specification header, which is the title block. The **General Data** portion of the spec includes details that were entered in the Instrument Index module. The **Process Conditions** portion values are derived from the Process Data module (if available) along with calculation results from the Calculation module (if available). If you defined multiple cases for a given tag, the specification displays the process data from the governing case.

You can generate the following types of specifications:

- Single-item specification — a document with details about a single item, or a specific process data case of an instrument. The source form for such a document can only contain single-section pages.
- Multi-tag instrument specification — a document with details about two or more instruments. A multi-tag instrument specification includes common pages with fields that are identical for all of the instruments, and a SEE LIST page with values that differ from instrument to instrument. A multi-tag specification is only available when the item type is instrument. The source form for such a document can only contain single-section pages.
- Loop composite specification — a document with details about a loop and its instrument tags. The source form for such a document must contain sections you define in the **Section Editor**: one loop section and one or more instrument sections.
- Instrument composite specification — a document that integrates data about several instruments or process data cases of an instrument. In contrast to multi-tag instrument specifications, an instrument composite specification does not have common pages and can include tags whose process functions are not identical. The source form for such a document must contain sections you define in the **Section Editor**. Each section in a composite spec page contains data pertinent to a specific instrument tag or process data case.

It is possible to generate specs either in the Specifications module, or in the **Domain Explorer**. In the Specifications module, you can generate one spec at a time, and open this spec on completing the generation. In the **Domain Explorer**, you can only generate instrument specs but you can generate specs in batch mode, provided that you defined specification options in the instrument type profile of the instruments you select in the **Domain Explorer**. For details, see *Define Specification Options in an Instrument Type Profile* (on page 197).

NOTES

- If you want to generate a non-instrument spec (for example, a panel spec or a hook-up item spec), you must first restore the appropriate library forms.
- You cannot generate specifications for virtual tags.
- It is only possible to generate one spec at a time.

Specification General Operations Common Tasks

The following tasks deal with such operations as batch generation and deletion of specs, describes the ways of defining spec document numbers and opening existing specs, and also addresses other miscellaneous operations you can perform with specs in SmartPlant Instrumentation.

Define Specification Options in an Instrument Type Profile

Use this procedure to associate a specification form, multi- tag list format and form data template with a particular instrument type profile. This way you set the software to apply the defined profile options when generating instruments belonging to this instrument type. For more information, see *Define Specification Options in an Instrument Type Profile* (on page 197).

Generate Instrument Specs in Batch Mode

Use this procedure to generate specs for instruments you select in the **Domain Explorer**, or Instrument Index Standard Browser view. For more information, see *Generate Instrument Specs in Batch Mode* (on page 198).

Open a Spec from the Instrument Index Standard Browser View

Use this procedure to open an existing specification from an Instrument Index Standard Browser view. To open a spec, you must make sure that on the **Preferences** dialog box, under **Browser view**, the **Open specification sheet** setting is either **Always** or **Ask User**. For more information, see *Open a Spec from the Instrument Index Standard Browser View* (on page 198).

Open a Spec from the Specifications Module

Use this procedure to find an item and the form number on which the item specification is based and open it the Specifications module. For details, see *Open a Spec from the Specifications Module* (on page 199).

Create a Tag Number in the Specifications Module

Use this procedure to create an instrument tag in the Specifications module. This allows you to generate an instrument specification without having to create a new instrument tag first in the Instrument Index module or the **Domain Explorer**. For more information, see *Create a Tag Number in the Specifications Module* (on page 199).

Delete Specs in Batch Mode

Use this procedure to delete a batch of specifications. You can use the same procedure if you need to delete only one specification. Using this procedure, you can delete single- tag specs and multi-tag specs. It is only possible to delete specs from the Specifications module. The software does not allow you to delete a spec that is currently assigned to a Specification Binder package or revised in the Document Binder module. For more information, see *Delete Specs in Batch Mode* (on page 200).

Add Expanded Notes and Remarks

Use this procedure to add text in the **Note** tab of a specification if the space in the note box in the specification data sheet is insufficient to enter all the text string. For more information, see *Add Expanded Notes and Remarks* (on page 200).

Ways of Defining a Spec Document Number

This topics lists the Specifications module options that allow you to define a document number for a spec. If the Domain Administrator has set the document number naming convention for specs, the software automatically creates a default document number on generating a specification. You can either accept this number or modify it as you require. For more information, see *Ways of Defining a Spec Document Number* (on page 201).

Define Specification Options in an Instrument Type Profile

1. In the Instrument Index module, open the **Instrument Type Profile** dialog box for an instrument type for which you want to define specification options. For details, see *Define an Instrument Type Profile* (on page 84).
2. On the **General** tab, select **Include instrument specification**.
3. From the **Specification form** list, select a form you want to set as the default form for all instrument that belong to the current instrument type.

TIPS

- The list contains specification forms that are assigned to the process function specified on the **Instrument Types** dialog box.
 - If the specified form is defined as a multi-tag form, you can then select a specific format from the **Multi-tag list format** dialog box.
4. If you selected a multi-tag spec form from the **Specification** list, from the **Multi-tag list format** list, select a specific format for the multi-spec form.

TIPS

- The software creates the specification as a master tag in a multi-tag specification. In this case, since you cannot move a master tag to a different multi-tag specification or redefine it as a single tag specification, the only way to change the specification for this tag is to delete the specification and then reassign a new specification to the tag.
 - If you do not select any format, the software creates the spec as a single-tag spec even if the source form is defined as a multi- tag form. Afterwards, you can move this spec it to a new multi-tag spec or an existing one.
5. If you defined a form data template for the selected spec form in the Specifications module, from the **Copy data from template** list, select a template from which you want to copy the default data to a generated spec.
 6. On the **Instrument Type Profile** dialog box, click **OK**.
 7. On the **Instrument Types** dialog box, click **OK**.
 8. On the menu bar, click **File > Preferences**.
 9. On the **Preferences** dialog box, click **Instrument Index > Profile** page, do one of the following:
 - Select **Specifications and maintenance events** if you want to use the defined profile options automatically when creating tag numbers.
 - Clear **Specifications and maintenance events** if you want to create tag numbers without any specifications. If you then manually generate a specification for the created tag, the software applies the existing instrument type profile options.

Generate Instrument Specs in Batch Mode

1. Do one of the following:
 - In the Instrument Index module, open the Instrument Index Standard Browser view, and then, select one or more instruments.
 - Press F7 to open the **Domain Explorer** and then, in the **Items** pane, select the instruments you require.
2. Right-click the selected instruments, and then, on the shortcut menu, click **Actions > Generate a Specification**.

TIP The software generates specs according to the profile settings defined for the instrument type to which the selected instrument tags belong. For example, if you want to add certain instruments to a see list of a multi-tag spec, make sure that on the **Instrument Type Profile** dialog box, you specified both the spec form number and the see list format. For details, see *Define Specification Options in an Instrument Type Profile* (on page 197).

3. On the **Results** dialog box, view the spec generation results, and then click **Close**.

TIP The software does not open the generated specs automatically because you cannot open several specs at a time. If you want to open a spec, select a specific instrument and then, on the shortcut menu, click **Reports > Specification**.

Open a Spec from the Instrument Index Standard Browser View

Prerequisite

You can only perform this procedure if you have already generated a spec for the selected tag in the Specifications module. Also, to open a spec, you must make sure that on the **Preferences** dialog box, under **Specifications > General > Browser view options**, the **Open specification sheet** setting is either **Always** or **Ask User**.

1. In the Instrument Index Standard Browser View, select an instrument.
2. On the main toolbar, click .

See Also

Composite Specifications (on page 259)

Multi-Tag Specs (see "Multi-Tag (See List) Specifications" on page 245)

Non-Instrument Specs (see "Non-Instrument Specifications" on page 257)

Pipe Specs (on page 309)

Save, Export, and Import Options (on page 281)

Single-Tag Specs (see "Single-Tag Specifications" on page 235)

Process Data Case Specs (on page 241)

Open a Spec from the Specifications Module

1. Do one of the following:
 - On the **Modules** menu, click **Specifications**.
 - On the toolbar, click .
2. On the **Actions** menu, click **Open Specification**.
3. On the **Open Specification** dialog box, from the **Item type** list select the type of the item whose spec you want to open.
4. If the item type is **Instrument**, from the **Tag class** list, select the appropriate tag class.
5. With the mouse pointer in the **Item number** box, do the following:
 - a. Click **Find** to open the **Find Items** dialog box.
 - b. In the boxes in the upper part of the dialog box, type or select the parameters for the properties that you want to find.
 - c. Click **Find** to display a list of items according to the search parameters that you have selected.
 - d. Select the required item from the retrieved list.
 - e. Click **OK** to accept your choice and return to the **Open Specification** dialog box.
6. With the mouse pointer in the **Form number** box, do the following:
 - a. Click **Find** to open the **Select Specification Form** dialog box.
 - b. Select the required form and click **OK**.
7. On the **Open Specification** dialog box, click **OK** to open the spec associated with the item that you selected.

See Also

Composite Specifications (on page 259)

Multi-Tag Specs (see "Multi-Tag (See List) Specifications" on page 245)

Non-Instrument Specs (see "Non-Instrument Specifications" on page 257)

Pipe Specs (on page 309)

Save, Export, and Import Options (on page 281)

Single-Tag Specs (see "Single-Tag Specifications" on page 235)

Process Data Case Specs (on page 241)

Open a Spec from the Instrument Index Standard Browser View (on page 198)

Create a Tag Number in the Specifications Module

1. Click **File > Preferences > Specifications**, and on the **General** tab, under **Tag creation**, select **Allowed**.
2. On the **Specifications Module** window menu bar, click **Actions > Open Specification**.
3. On the **Open Specification** dialog box, from the **Item type** list, select **Instrument**.
4. On the **Item number** box, type the number of the instrument that you want to create and click **Yes** when prompted to create a new tag number.
5. If the **Select Instrument Type** dialog box opens, select the appropriate instrument type and click **OK**.
6. On the **Loop Number** dialog box, accept the displayed loop number or type a new one as required, and then click **OK**.
7. On the **Tag Number Properties** dialog box, define the tag properties as you require, and then click **OK**.

TIP At this stage, you can define the spec form number and generate a specification for the instrument tag that you have created.

Add Expanded Notes and Remarks

- In a given specification, do the one of the following:
 - Click **Actions > Expand Notes**.
 - Click the **Notes** tab in the specification.

TIPS

- On SQL Server, the **Note** sheet can accept up to 255 characters; on Oracle or Sybase Adaptive Server Anywhere, you can type up to 2000 characters.
- Non-English, special character ASCII code, used in a note, is not displayed correctly in print preview.

See Also

Composite Specifications (on page 259)

Multi-Tag Specs (see "Multi-Tag (See List) Specifications" on page 245)

Non-Instrument Specs (see "Non-Instrument Specifications" on page 257)

Pipe Specs (on page 309)

Save, Export, and Import Options (on page 281)

Single-Tag Specs (see "Single-Tag Specifications" on page 235)

Process Data Case Specs (on page 241)

Delete Specs in Batch Mode

1. With the Specifications window open, on the **Actions** menu, click **Delete Specifications**.
2. In the **Select Items** dialog box, find and select the items whose specs you want to delete.

TIPS

- If you created instrument specifications per tag case, you can delete specifications on a per-case basis. For example, if you applied three process data cases to a tag, three records appear in the **Search results** data window. The **Case** column values indicate whether instrument tags have tag process data cases.
 - If the tag number selection includes a master tag, the software prompts whether you want to perform or cancel the deletion of the specifications. You have an option to cancel the deletion because when you delete a master tag, the software dissociates all the other tags from the multi- tag specification to which the master tag belongs.
3. In the **Delete Specifications** dialog box, click **Run**.

TIPS

- If the software could not delete a specification, the source item appears in the **Items skipped during deletion** data window. You can print out the item list, if needed. These records are not saved after you close the **Delete Specifications** dialog box.
- When you delete a specification, the software automatically deletes all the associated revisions as well, whether you saved them to the database, or as files. The software removes revisions that were saved as files from the **Manage Spec Revisions** dialog box, and also from the folders to which they have been saved.

NOTE Deleting a spec does not affect process data. The software only deletes the specification document, together with the document number and associated revisions, whether you saved them to the database, or as files. The software removes revisions that were saved as files from the **Manage Spec Revisions** dialog box, and also from the folders to which they have been saved.

Ways of Defining a Spec Document Number

In the Specifications module, you have the following ways of defining a spec document number:

- When generating a new spec — On the **New Specification** dialog box, in the **Document number** box, you can modify the default document number as you require. The software always generates automatically a document number for a specification, regardless of whether the document number naming convention exists. If the domain Administrator has not defined a naming convention for spec document numbers, the software creates the document number using the item tag name as a source, and append the -SP suffix.
- In the spec title block — You can open a spec and define the document number in the **Doc No.** field of the title block.
- In the **Revisions** dialog box — With a spec displayed, you open the **Revisions** dialog box and, in the **Document number** box, define the document number.

NOTES

- The document number string can contain up to 50 alpha-numeric characters, including spaces.
- The document number must be unique.
- If you remove the document number, the current spec document does not appear in the **Document Explorer**.

SECTION 17

Specification Pages

Specification pages are the primary templates for spec forms, on which you base specs. Spec pages enable you to categorize data within a specification form. For example, a specification form can contain a thermowell specification page, a control valve specification page, and a large note page.

SmartPlant Instrumentation provides a default library of spec pages you can use in spec forms. A spec is always associated with a specific process function. If needed, you can select a different process function for a page, provided that this page is not in use in specs. A spec page contains a number of data fields, which correspond to table columns in the database, and also contains field headers, which correspond to column headers in the database. You can customize the data fields and fields headers to fit specific requirements. You cannot, however, create new pages in SmartPlant Instrumentation.

All spec pages are based on the A4 print sheet size. It is also possible to use the Letter print sheet size when printing specs. Note, however, that if the title block assignment method in the current domain is defined as **Standard (used in all modules)**, you need to adjust your title block before printing specs using the Letter size. For details, see *Spec Title Blocks* (on page 265).

You open and manage spec pages in the **Page Editor** of the Specifications module. Then you can use the **Edit Fields and Headers** floating toolbar options to modify the spec page field layout without having to use a third-party interface, such as InfoMaker. Note, however, that if you want to assign new select lists or drop-down data window to spec page fields, you must use InfoMaker.

Open a Page

Use this procedure to open a spec page in the **Page Editor**.

IMPORTANT If you want to open a page that is based on a spec form that was imported in the Administrations module, you must first regenerate this page. You can regenerate a single page or multiple pages in batch mode. For more details, see *Regenerate a Specification Page* (on page 205) or *Regenerate Pages in Batch Mode* (on page 205). For information about importing specification forms, see *SmartPlant Administration Help, Domain and Project Administration > Add-Ins > Import Spec Forms*.

1. In the **Specifications Module** window, do one of the following to open the **Page Editor**:
 - Click **Edit > Page Editor**.
 - On the toolbar, click .
2. Do one of the following:
 - On the menu bar, click **Actions > Open Page**.
 - On the toolbar, click .
3. On the **Select Specification Page** dialog box, select a page.

TIPS

- On the **Select Specification Page** dialog box, selected **Custom** check boxes indicate pages that you have customized.
 - You can click **Properties** to change the name and description of the page you want to open.
4. Click **OK** to open the page in the **Page Editor**.

Open a Page from an External File

Use this procedure to open in the Page Editor a spec page from a .psr file.

IMPORTANT If you want to open a page that is based on a spec form that was imported in the Administrations module, you must first regenerate this page. You can regenerate a single page or multiple pages in batch mode. For more details, see *Regenerate a Specification Page* (on page 205) or *Regenerate Pages in Batch Mode* (on page 205). For information about importing specification forms, see *SmartPlant Administration Help, Domain and Project Administration > Add-Ins > Import Spec Forms*.

1. In the **Specifications Module** window, do one of the following to open the **Page Editor**:
 - Click **Edit > Page Editor**.
 - On the toolbar, click .
2. Do one of the following:
 - Click **Actions > Open File**.
 - On the toolbar, click .
3. On the **Open File** dialog box, navigate to the folder where your .psr file is located and select the file.
4. Click **OK**. After clicking **OK**, one of the following scenarios is possible:
 - The software automatically opens the .psr file as a page in the **Page Editor**.
 - The software prompts you to regenerate the page first because some required columns are missing in the page. In this case, click **Yes** to regenerate the page automatically and then open it in the **Page Editor**.
 - If the spec item type is not defined in the source .psr file, the software displays the **Select Item Type** dialog box, where you must select the target item type and assign it to the .psr file. Clicking **OK** on the **Select Item Type** dialog box opens the page in the Page Editor.

Display Data Field Names

Use this procedure to display the names of the data fields that a particular page contains.

1. Open a spec page in the **Page Editor**.
2. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .
3. On the **Edit Fields and Headers** toolbar, click  to display in the **Field Selection** area all the field names which are used in the currently open page.
4. Click  again to hide the display of the field names.

Display a List of Forms that Include the Current Page

You can use this procedure to check whether there are any spec forms that already include a specific page that you open in the **Page Editor**. If you make any changes in this page and save it, the software automatically updates all the forms that include this page.

1. In the **Specifications Module** window, do one of the following:
 - Click **Edit > Page Editor**.
 - On the toolbar, click .
2. On the **Page Editor** menu bar, click **Actions > Form List**.

Regenerate a Specification Page

This procedure enables you to correct discrepancies that can occur on a specific single-section spec page, and to influence the display of various tables and table columns in the **Table Column List** pop-up window in the **Page Editor**. When you implement this procedure, SmartPlant Instrumentation automatically eliminates duplicate data fields on the current page and updates the definition of the data fields included in the current page according to their current table column definitions in the database.

NOTE You can only use this procedure to regenerate a single-section page. If you need to regenerate a composite page, you must regenerate specific sections in the **Section Editor**.

1. Open a spec page in the **Page Editor**.
2. On the menu bar, click **Actions > Regenerate Page**.
3. On the **Regenerate Page** dialog box, under **Select tables and views**, select a check box for each table or view from which you want to display additional columns in the **Table Column List** pop-up window.

NOTE Some tables, such as Component and Flow, do not appear in the list. These tables contain mandatory fields and are also regenerated. The fields will appear in the **Table Column List** window when you open **Edit > Column List**.

4. Under **Show Columns**, click **Show** for each required table or view.
5. Under **Select columns**, do one of the following:
 - Select the **Select all** check box to select all the columns in the table.
 - Hold down the **Ctrl** key and select or clear specific columns as desired.
 - Click **OK**.

Regenerate Pages in Batch Mode

This procedure enables you to select several single-section spec pages and automatically eliminate duplicate data fields on the selected pages and update the definition of the data fields included in the pages according to their current table column definitions in the database.

NOTE Usually, batch regeneration of spec pages is required only once, after a version upgrade. Therefore, we recommend that your Domain Administrator perform this operation after upgrading SmartPlant Instrumentation.

1. In the **Specifications Module** window, do one of the following to open the **Page Editor**:
 - Click **Edit > Page Editor**.
 - On the toolbar, click .
2. On the menu bar, click **Actions > Regenerate Pages in Batch Mode**.
3. Select one or more pages.

TIP In the **Page Editor**, you can only regenerate single-section pages; therefore, the **Regenerate Pages in Batch Mode** does not display any pages that have multiple sections (composite pages). If you need to regenerate composite pages, you must regenerate specific sections in the **Section Editor**.

4. Click **Run** to start the regeneration process and view the regeneration results in the **Result** column on the **Regenerate Pages in Batch Mode** dialog box.

Save a Page to the Database

Use this procedure to save a page to the SmartPlant Instrumentation database. You can save any page to the database, whether this is a page you open from an external file, or a library page you modified.

To save the page to the database under a new name, or to save a page opened from an external file to the database:

1. Open a spec page in the **Page Editor**.
2. Click **Actions > Save as Page**.
3. On **Save as Page** dialog box opens, do one of the following:
 - To create a new page, click **New**. On the dialog box that opens, type a unique name and an optional description, and then click **OK**.
 - To overwrite an existing page, highlight the page you wish to replace on the **Specification Page** column and then click **OK**. When asked to confirm overwriting the existing page, click **Yes**.

NOTES

- Clicking **Actions > Save** also saves the page to the database (under the same name as the currently open page). You cannot use the **Actions > Save** option to save a page opened from an external file.
- After you save a library page whose data fields you modified, the software treats it as a custom page.

Save a Page as an External File

Use this procedure if you need to save a page as an external file so that it can be used with a third-party application, such as InfoMaker. You can save a page either as a .psr (PowerSoft Report) file or a .wmf (Windows METAFILE) graphic.

1. Open a spec page in the **Page Editor**.
2. Do one of the following:
 - Click **Actions > Save as File**.
 - On the **Page Editor** toolbar, click .
3. On the **Save As** dialog box, navigate to the required folder and type the target file name.

TIP You can save the page as a .psr (PowerSoft Report) file or a .wmf (Windows METAFILE) graphic.

4. Click **OK** to save the file.

Delete a Page

Use this procedure to delete a specific spec page that is not associated with forms, that is, a page you opened from a file, or a new page that you created on the basis of an existing page. Also, you can delete a page that was previously associated with a library form but you decided to retain this page after deleting the form. After deleting such a page, you can restore it automatically by restoring the library form that the page is based on. If you want delete a page you saved to the database from an external file, we recommend that you first save this page as a file. After deleting such a page, you can restore it by opening it from the external file.

1. On the **Page Editor** menu bar, click **Actions > Delete Page**.
2. On the **Select Specification Page** dialog box, select the page you want to delete and click **OK**.

TIP In the **Page Editor**, you can only delete a specific page, provided that it is not in use in a spec form. If you want to delete all pages included in a particular form, you need to delete the entire form. If this form is a library form, you can restore the deleted pages automatically when restoring this form. Note, however, that when restoring the form, the software only restores the library pages, not pages you opened from an external file and then included in this form.

Create a Large Note Page

Use this procedure to create a large note page on the basis of any existing page. A large note page is a page that consists of a text area and a title block. A large note can appear on a separate page. To create a large note on a separate page, you must use only the `spec_note_large` column of the `add_spec9` table. When creating or modifying a specification form, you can add a large note page to display large note text in the appropriate specifications. You create a new large note page on the basis of any existing page.

In a print preview for a specification that contains a large note, the software displays a large note on a separate page in which you can scroll up and down to view the note text. When printing a specification with a large note page, the software automatically counts the total number of sheets and divides the large note page into separate sheets, depending on the note text length.

1. In the **Specifications Module** window, do one of the following to open the **Page Editor**:
 - Click **Edit > Page Editor**.
 - On the toolbar, click .
2. Do one of the following:
 - On the menu bar, click **Actions > Open Page**.
 - On the toolbar, click .

TIP We recommend that you use a page with the General process function. You need to perform a separate procedure to change the page process function to General. For details, see *Select a Different Process Function for a Page* (on page 208).

3. Do one of the following:
 - On the menu bar, click **Actions > Regenerate Page**.
 - On the toolbar, click .
4. On the **Regenerate Page** dialog box, under **Select tables, views, and columns**, select the check box for the `add_spec9` table.
5. In the cell adjacent to the `add_spec9` table cell, click **Show** to display the `spec_note_large` column in the **Column Name** data window.
6. Click **OK** to regenerate the page.

7. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .

IMPORTANT Before adding the spec_note_large column to the current page as a data field, make sure that the page does not contain any other data fields apart from the title block. If the page is not empty, you must delete all of the data fields. For details, see *Delete Data Fields* (on page 223).
 8. On the **Edit Fields and Headers** floating toolbar, click .
 9. In the **Table Column List** pop-up window, select **spec_note_large**.
 10. Drag the spec_note_large column from the **Table Column List** pop-up window and drop it anywhere on the page.
 11. Click  to close the **Table Column List** pop-up window.
 12. For your convenience, if needed, resize the spec_note_large data field as follows:
 - a. Point to the spec_note_large field border so that the cursor changes to a double-headed arrow.
 - b. Resize the spec_note_large field by dragging the field borders to either side so that the field occupies the entire page area, apart from the title block

TIP You do not have to resize the spec_note_large data field exactly. When printing a form that with a large note page the software resizes the spec_note_large data field automatically so that the spec_note_large data field occupies the entire area of the printed specifications.
 13. On the **Actions** menu, click **Edit Fields and Headers** to close the floating toolbar.
 14. Save the large note page to the database.
- NOTE** If required, you can use the spec_note_large field on a data page. By default, a data page in SmartPlant Instrumentation is the first page in a specification form and contains various field values.

See Also

Regenerate a Specification Page (on page 205)

Save a Page to the Database (on page 206)

Select a Different Process Function for a Page

You can select a different process function for an existing page. In this way you can use the same page for instrument tags with different process function types. You cannot change the process function of a page that is already in use in specs.

1. Open a spec page in the **Page Editor**.
2. Click **Actions > Change Process Function**.
3. Select the target process function and click **OK**.

TIPS

- You cannot change the process function of a page that is already in use in specs. In this case you are prompted to save the page under a different name.
- When changing the page process function, the software automatically eliminates duplicate data field names in the current page, and also updates the definition of the data fields included in the current page according to their current table column definition in the database.
- Changing the page process function may prompt a warning, preceded by SQL command error messages. These messages inform you that the page for which you are changing the process function contains undefined values, for example, specification custom fields.

- The data fields that caused SQL statement errors are not available in the page after the process function change takes effect.
- 4. On the **Regenerate Page** dialog box, select a check box for each table or view from which you want to change the display of table columns in the **Table Column List** pop-up window.

TIP When you changed the process function, the software automatically updated the table columns available to you in the **Table Column List** pop-up window.
- 5. Under **Show Columns**, click **Show** for each required table or view.
- 6. Under **Select columns**, do one of the following:
 - Select the **Select all** check box to select all the columns in the table.
 - Hold down the **Ctrl** key and select or clear specific columns as desired.
- 7. Click **OK**.

Set the Tab Order of the Fields on a Page

You can set the sequence in which you move the cursor in the page you are editing. This way you determine which fields the cursor moves to when you press the Tab key.

1. Open a spec page in the **Page Editor**.
2. Click **Actions > Tab Order** to display the tab numbers on the page.
3. Set the field order by typing in sequence numbers (20, 30, 40, and so forth) in the fields that you want to sequence.

TIPS

- Assigning a zero (0) to a field means that this field becomes non-editable in a generated spec. Some fields are read-only by default and not available for editing even if you assign a tab sequence to them.
 - The zero number applies to all fields you added in the page using InfoMaker. Therefore, in a spec page containing fields added in InfoMaker, after defining the tab order, you must switch to the default tab order. For details, see *Switch to the Default Tab Order* (on page 209).
4. When done, click **Actions > Tab Order** once again, to clear the tab number display.

Switch to the Default Tab Order

You can switch from the tab order in the page you are currently editing to the default tab order. This procedure is necessary if you imported a spec page you edited in InfoMaker and this page contains fields added in InfoMaker. After you set the tab order of the fields on such a page, the fields added in InfoMaker are not editable because the zero tab order number is assigned to them. Switching to the default tab order enables you to remove the zeros automatically and assign sequence numbers for editing the fields.

CAUTION This action overwrites the tab order in the currently open page with the default tab order. After performing this procedure and saving the page, it is not possible to revert to the original tab order.

1. With the specification page open for editing, click **Actions > Tab Order** to display the tab numbers on the page according to the current tab order.
2. Click **Actions > Default Tab Order**.
3. Click **Actions > Tab Order** to clear the tab number display.
4. Save the spec page.

Retrieve Custom Pages as PSR Files

Use this procedure to retrieve one or more custom pages from the database as .psr files. In the target folder that you specify, the software saves each page as a separate .psr file with the name PAGE<page ID number>.psr. You can use this procedure if you need to back up pages before editing them in the **Page Editor**, or if you need to share pages with users outside of a given SmartPlant Instrumentation network.

1. On the **Specifications Module** window menu bar, click **Actions > Retrieve Custom Pages as PSR Files**.
2. Select one or more custom pages.
3. Under **Target folder**, accept the displayed folder path, or click **Browse** to specify a target folder for saving the selected custom pages as .psr files.

TIP The path displayed in the **Target folder** box is the path set for the **PSR working folder** option on the **Specifications > General** page of the **Preferences** dialog box.

4. Click **OK**.

Requirements for Creating User-Defined Views

When creating a view in InfoMaker or Internal Setup Utility, you run the CREATE VIEW SQL command. We recommend that you create a new view on the basis of an existing view shipped with SmartPlant Instrumentation and modify the column selection in the new view as you require. When creating a new view, make sure the following requirements are met:

- The view must contain the CMPNT_ID column.
- The CMPNT_ID value must be unique.
- The number of rows in the created view must match the number of rows in the COMPONENT table of SmartPlant Instrumentation. The COMPONENT table contains the appropriate instrument tags that must appear in the view.
- When creating a view for a specific project in an owner operator domain, you must create the same view in the Domain schema, As-Built schema, Project schema of the target project, target Combined Project schema.

TIP For details on establishing a connection to a database schema available in SmartPlant Instrumentation, see refer to the appropriate topics in the *Internal Setup Utility Online Help*, *Connecting to the SmartPlant Instrumentation Database* set of topics.

Associate User-Defined Views

This option enables you to associate a SmartPlant Instrumentation database view that you created in an external application such as InfoMaker. After associating an appropriate database view, you can use the data it contains in specifications. When creating a user-defined database view, you can include in this view any combination of SmartPlant Instrumentation table columns, with each column belonging to a different SmartPlant Instrumentation table. Using database views, you can retrieve data from the required tables and display this data in specification documents. For example, a certain instrument is assembled on a line. You use your database view to automatically retrieve data related to that line, for example, line process data, pipe related material, and so forth.

IMPORTANT Before using this procedure, make backups of all your user-defined views. When upgrading your SmartPlant Instrumentation version, note that in the new version, some tables or columns might have been modified. If you have upgraded your database after associating user-defined views, you cannot use the views in which the table records do not match the new table records of the new database. To enable the use of these views, you must run a set of SQL statements to re-create the user-defined views.

1. On the **Specifications Module** window menu bar, click **Actions > Specification Views**.
2. On the **Specification Views** dialog box, click **New**.
3. In the new row, type the appropriate view name.

TIP The name of the new view must be exactly the same as the name defined in your external application (the name is not case-sensitive). The software validates the name and checks whether the view complies with the SmartPlant Instrumentation-specific conditions.

4. Under **Item Type**, from the list, select the item type you want to associate with the current view.

TIP For a user-defined view, you can select an item type from a list. For the default views, the item type is fixed. The displayed item type indicates that you can only use the current view in a specific item specification. For example, you can only use the default view **cable_type** in a cable specification.

5. Click **OK**.

TIP The associated view becomes available for selection on the **Regenerate Page** dialog box in the **Page Editor**.

Working with Page Graphics Common Tasks

These tasks deal with adding graphic objects in a spec page and modifying their properties. These graphic objects include data fields, text boxes, computed fields, grid lines, and so forth.

Add a Line to a Page

Use this procedure to add a graphic line to a specification page. For more information, see *Add a Line to a Page* (on page 212).

Modify Line Position and Length Using Arrow Keys

Use this procedure to modify the position and length of a single line on a page using the arrow keys on the keyboard. For more information, see *Modify Line Position and Length Using Arrow Keys* (on page 213).

Modify Line Position and Length Using the Mouse

Use this procedure to modify the position and length of a single line on a page using the mouse. For more information, see *Modify Line Position and Length Using the Mouse* (on page 213).

Set Precise Position and Length of a Line

Use this procedure to set the X and Y coordinates of a single line. For more information, see *Set Precise Position and Length of a Line* (on page 213).

Change Line Properties

Use this procedure to change color, style, and thickness properties of a single line you select in a spec page. For more information, see *Change Line Properties* (on page 214).

Duplicate Page Lines

This procedure enables you to duplicate a graphic line on a page. For more information, see *Duplicate Page Lines* (on page 214).

Add Graphics to a Page

Use this procedure to add graphic images to your specification pages. The graphic files that you include in your pages must be in .bmp format. For more information, see *Add Graphics to a Page* (on page 215).

Set Precise Position and Size of Page Objects

Use this procedure to set the X and Y coordinates of a page object. You can set precise size and position of data fields, text boxes, computed fields, and graphic elements, for example, lines. For more information, see *Set Precise Position and Size of Page Objects* (on page 216).

Modify Position and Size of Page Objects Using Arrow Keys

Use this procedure to modify the position and size of a page object using the arrow keys on the keyboard. You can modify size and position of data fields, text boxes, computed fields, and graphic elements, for example, lines. For more information, see *Modify Position and Size of Page Objects Using Arrow Keys* (on page 216).

Modify Position and Size of Page Objects Using the Mouse

Use this procedure to modify the position and size of a page object using the mouse. You can modify size and position of data fields, text boxes, computed fields, and graphic elements, for example, lines. For more information, see *Modify Position and Size of Page Objects Using the Mouse* (on page 216).

Add a Line to a Page

1. Open a spec page in the **Page Editor**.
2. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .
3. On the **Edit Fields and Headers** toolbar, click .
4. In the **Page Editor** working area, do one of the following:
 - For a horizontal line, click the location of the left end of the line that you want to create.
 - To prepare for a vertical line, click to the left of the location.
5. On the **Line** dialog box, under **Line ID**, accept the default ID or type a different unique line ID number.
6. Accept the displayed line end coordinates or enter new coordinates as you require.
7. Under **Line color**, select the color that you need.
8. Under **Line style**, select the line display style that you need.
9. Under **Line thickness**, type the new value or use the spinners to set a value using PowerBuilder units from one to five.
10. Click **OK** to display the new line on the page (the software displays small white dots at the ends of the line that you just created).

Set Precise Position and Length of a Line

1. Open a spec page in the **Page Editor**.
2. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .
3. In the **Page Editor** working area, double-click a line to open the **Line** dialog box.
4. Under **Line end coordinates**, enter type the appropriate values or use the spinners.
TIP You enter the **X** and **Y** values using PowerBuilder units.
5. Click **OK**.

Modify Line Position and Length Using Arrow Keys

1. Open a spec page in the **Page Editor**.
2. In the **Page Editor** working area, click the line that you want to modify.
TIP The software displays small white dots at the ends of the line that you select.
3. Using the keyboard arrows, move the line until you place it correctly.
4. Size the line as follows:
 - To make the line shorter, press Shift + Left Arrow.
 - To make the line longer, press Shift + Right Arrow.
 - To change the line position from horizontal to diagonal or vertical, press Shift + Up Arrow until you position the line correctly.

Modify Line Position and Length Using the Mouse

1. Open a spec page in the **Page Editor**.
2. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .
3. In the **Page Editor** working area, select a line.
TIP The software displays small white dots at the ends of the line that you selected.
4. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - To move the line, place the cursor over a line end so that the cursor changes to cross-hairs, and then drag this end to a new location. The other end of the line remains anchored.
 - To move the line from one location to another, without changing orientation or length, drag the line from the middle.

Change Line Properties

1. Open a spec page in the **Page Editor**.
2. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .
3. On the **Edit Fields and Headers** toolbar, click .
4. In the **Page Editor** working area, click the line whose properties you want to change.
TIP The software displays small white dots at the ends of the line that you selected.
5. Double-click the selected line to open the **Line** dialog box.
6. Under **Line ID**, accept or modify the line ID as you require.
TIP You need to define the line ID if you intend to save the current page in .psr format and then customize it in InfoMaker. The line ID must be unique.
7. Under **Line color**, select the color that you need.
8. Under **Line style**, select the option that you need.
9. Under **Line thickness**, type the new value or use the spinners to set a value using PowerBuilder units from one to five.
10. Click **OK** to update the line properties on the page.

Duplicate Page Lines

1. Open a spec page in the **Page Editor**.
2. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .
3. On the **Edit Fields and Headers** toolbar, click .
4. In the **Page Editor** working area, click the line that you want to duplicate.
TIP The software displays small white dots at the ends of the line that you selected.
5. On the **Edit Fields and Headers** toolbar, click .
- TIP** The software displays the duplicated field a bit lower and towards the right of the original line.
6. Select the duplicate line, and drag it to the location that you need.

Add Graphics to a Page

1. Open a spec page in the **Page Editor**.
 2. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .
 3. On the **Edit Fields and Headers** toolbar, click .
 4. In the **Page Editor** working area, do one of the following:
 - Click a free area of the page.
 - Click a specific location on the page where you want to insert the graphic.
 5. On the **Picture** dialog box that opens, under **Picture ID**, accept the default value or type a different unique picture ID number.
 6. Under **File name**, do one of the following:
 - Type the path and name of the .bmp file that you want to use for the picture.
 - Click  and navigate to the .bmp file that you want to insert.

TIP You can only insert graphic files with the .bmp extension.
 7. Click **OK**.
 8. To move the graphic within the page, click the graphic and do one of the following:
 - Use the arrow keys.
 - Drag the graphic using the cursor.
 9. To resize the selected graphic, do the following:
 - a. Move the cursor to the edge or to the corner that you want to resize, until a two-headed arrow appears.
 - b. Drag the corner or the edge of the graphic to its new location.
 10. To delete the selected graphic, on the **Edit Fields and Headers** toolbar, click .
 11. When you are satisfied with the appearance of the graphic, on the **Actions** menu, click **Edit Fields and Headers** to close this toolbar.
 12. On the **Actions** menu, click the **Save** option that you require.
- TIP** You can save the page under the current or different name, or as an external file. For more details, see *Save a Page to the Database* (on page 206), and *Save a Page as an External File* (on page 206).

Set Precise Position and Size of Page Objects

1. Open a spec page in the **Page Editor**.
2. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .
3. In the **Page Editor** working area, click the object whose X and Y coordinates you want to set.
4. Do one of the following:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .
5. On the **Edit Fields and Headers** toolbar, click .
6. In the **Field or Header Position** pop-up window, enter the **X** and **Y** values as you require.
TIP The X and Y values are PowerBuilder unit coordinates of the upper left corner of the object.
7. In the **Width** and **Height** boxes, enter the appropriate values.

Modify Position and Size of Page Objects Using the Mouse

1. Open a spec page in the **Page Editor**.
2. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .
3. In the **Page Editor** working area, click the object whose X and Y coordinates you want to set.
4. To move the object, place the cursor in the center of the object so that the cursor changes to cross-hairs, and then drag the object to its new location.
5. To resize the object, place the cursor in an object edge or corner so that the cursor changes to a double-headed resize arrow, and then drag the edge or corner to its new location.

Modify Position and Size of Page Objects Using Arrow Keys

1. Open a spec page in the **Page Editor**.
2. In the **Page Editor** working area, click the object that you want to modify.
3. Using the keyboard arrows, move the page object until the upper left corner is correctly placed.
4. Size the object as follows:
 - To make the object narrower, press Shift + Left Arrow.
 - To make the object wider, press Shift + Right Arrow.
 - To make the object shorter, press Shift + Up Arrow.
 - To make the object taller, press Shift + Down Arrow.

SECTION 18

Specification Page Customization

Specification pages customization is possible either in the **Page Editor** of the Specifications module or in InfoMaker. In the **Page Editor**, you use the **Edit Fields and Headers** floating toolbar options to add or remove data fields, modify field headers, and define field layout of a spec page. Changes that you make on the page automatically take effect in all existing specs that include this page, and also in the spec printout. These changes do not take effect in specs saved as .psr files. For example, if you change thickness of a specific line on a page, and then save the page to the database, the software updates the line display in all specs based on the form containing this page.

NOTE You must use InfoMaker if you want to assign new select lists or drop-down data window to spec page fields or if you need to customize calibration form pages. For details, see *Customizing Form Pages in InfoMaker Common Tasks* (see "Form Page Customization Procedures" on page 620).

Customizing Pages in the Page Editor Common Tasks

These tasks deal with customizing the display of the spec page data fields and their headers using the **Page Editor** options of the Specifications module. On a spec page, you cannot select more than one field or header at a time for customization.

Edit Field Headers

Use this procedure to modify the text that appears in the field headers. You can change the text itself, change the font characteristics: bold or not bold, italic, rotated (determine angle), text box size, text alignment, text color, and background color. For more information, see *Edit Field Headers* (on page 219).

Display Invisible Fields

This procedure enables you to display fields whose table column status in the database is set as invisible. You can then modify these table columns using a PowerSoft editor, such as InfoMaker. For more information, see *Display Invisible Fields* (on page 219).

Define Fields with Computed Values

This procedure allows you to define and modify an InfoMaker eligible expression for a data field in the current form. Such an expression is referred to as a computed value. The field containing such an expression is referred to as a computed field. For more information, see *Define Fields with Computed Values* (on page 220).

Display Revision Changes for Spec Properties

When you create a new revision for a specification sheet, you can show the revision number next to properties for which the values were changed at the last revision. To do this, you add a computed field for the property for which you want to indicate the change. For more information, see *Display Revision Changes for Spec Properties* (on page 221).

Format Field Values

Use this procedure to format values of data fields. The format that you set for the data field names is used by SmartPlant Instrumentation to display the field values in the specs based on a form containing this page. To differentiate among various data fields, you set left, center or right alignment, set font style and size, and set combinations of text and background colors. For more information, see *Format Field Values* (on page 221).

Add Data Fields to a Page

Use this procedure to add data fields to a specification page that you open in the **Page Editor**. The fields that you can add belong to one of the following types:

- Standard (non-custom) fields appropriate to the process function of the open page (displayed by default in the **Table Column List** pop-up window)
- Process data custom fields (displayed in the **Table Column List** pop-up window after you regenerate the page)
- Specification custom fields (some displayed by default in the **Table Column List** pop-up window, with option to select additional fields from the **Regenerate Page** dialog box)
- Standard fields available for all process functions (displayed on the **Regenerate Page** dialog box, with option to select additional fields for display in the **Table Column List** pop-up window)

For more information, see *Add Data Fields to a Page* (on page 222).

Duplicate Data Fields in a Page

This procedure enables you to duplicate a data field in a spec page. This way you need enter data only once for several identical fields in a page. For more information, see *Duplicate Data Fields in a Page* (on page 222).

Delete Data Fields

Use this procedure to delete an existing data field from a particular page. You can delete one data field at a time. Data fields that you delete reappear in the **Table Column List** pop-up window. For more information, see *Delete Data Fields* (on page 223).

Add Custom Fields of Wiring Equipment Items

This procedure allows you to add custom fields of wiring equipment items in a spec page. Custom fields of wiring equipment items appear in the table APPARATUS. You can use up to 30 fields in a specification. The custom fields in the APPARATUS table are designated by column names from APPAR_UDF_C01 to APPAR_UDF_C30. The custom fields that you add in a specification page hold view-only values in an item specification that you create using this page as a source. Each custom field holds a user-defined property value of a customized wiring equipment category. For more information, see *Add Custom Fields of Wiring Equipment Items* (on page 223).

Add Function Block Custom Fields to a Fieldbus Spec

Use this procedure to add function blocks in spec pages of the forms that you can use as a basis for fieldbus spec generation. Three specification forms are available for fieldbus data: form 72 for instrument with the General process function, 73 for flow instruments, and 74 for pressure instruments. These forms contain a fieldbus page that includes data for shipped function blocks. In addition to these function blocks, you can create your own function blocks and add data for them to the form page. Before adding custom function blocks in the specification page, you have to define them in the Instrument Index module. The order in which you define them determines the sequence number that they are mapped to when dragging the table columns onto the specification page. The shipped function blocks correspond to sequence numbers 1 to 21. Sequence numbers 22 to 40 are available for custom function block parameters. For more information, see *Add Function Block Custom Fields to a Fieldbus Spec* (on page 223).

Edit Field Headers

1. Open a spec page in the **Page Editor**.
 2. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .
 3. In the **Page Editor** working area, double-click a field header to open the **Edit Text** dialog box.
 4. On the **Edit Text** dialog box, do the following:
 - a. In the **Name** box, edit the field header text.
 - b. Select the text alignment option within the field text box.
 5. Select **Transparent** if you want to display the current Windows background color in the text box, or clear **Transparent** and then select the background color that you need.
 6. From the **Text color** list, select the text color that you need.
 7. Under **Font style**, select **Bold** or **Italic**.
 8. From the **Rotate** list, select an angle to rotate the text inside the text box.
- TIP** If you want to display an ampersand character & in the field header text, in the **Name** box, enter &&. For example, to display the **P&ID** header on the spec page, in the **Name** box, type **P&&ID**.
9. Click **OK**.

Display Invisible Fields

1. Open a spec page in the **Page Editor**.
2. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .
3. On the **Edit Fields and Headers** toolbar, click  to display the invisible data fields of the current page.

TIP If several data fields are positioned at the same spot (one on top of the other), you can only see the top data field. You can display the data fields underneath the top field simply by moving the fields aside.

Define Fields with Computed Values

You can enter any of the following data types, provided that they comply with the conventions used in InfoMaker:

Data Type	Example
Number	2210
String of characters	'AA' or "AA"
Field name	cmpnt_name
Function	upper(cmpnt_name)
Conditional if expression	(pd_fluid_phase='S','Steam','Water')

1. Open a page in the **Page Editor**.
2. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .
3. With the **Edit Fields and Headers** toolbar displayed, do one of the following to open the **Computed Field** dialog box:
 - On the **Edit Fields and Headers** toolbar, click  and then click a field in the **Page Editor**.
 - In the **Page Editor**, select and double-click a field to open the **Computed Field** dialog box showing the current computed value of that field.
4. In the **Name** box, do one of the following:
 - Type a new name to add a field with this name to the current page
 - Type a field name which already exists in the current page or leave the current value if you selected this field in the current page.
5. In the **Expression** box, type a value, function, or any other appropriate expression.
6. Click **Verify** to verify that the expression you entered is a valid InfoMaker expression.
7. Click **OK**.

NOTES

- If you make changes to a field in the currently opened page, the software displays the computed results automatically, using the settings you entered on the **Computed Field**.
- See your InfoMaker User Guide for additional information about the *data types you can use* as valid expressions for this procedure.

Display Revision Changes for Spec Properties

1. Open a page in the **Page Editor**.
2. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .
3. On the **Edit Fields and Headers** toolbar, click  and then click the page at the position where you want to place the computed field.
4. On the **Computed Field** dialog box, type a name for the computed field.
5. In the **Expression** box, type the following expression:
`f_changevalue(cmpnt_id,rev_id,dwg_id,"<field name>")`
TIP For example, to show changes for the maximum pressure, the expression is written as follows:
`f_changevalue(cmpnt_id,rev_id,dwg_id,"pd_press_max")`
6. Click **Verify** to verify that the expression you entered is a valid InfoMaker expression.
7. Click **OK**.
8. To show the change in the specification, do the following:
9. Modify an existing value of a property for which you added a computed field to display changes for the last revision.
10. Close the specification sheet and re-open it the following day.
11. Add a revision to the specification sheet and refresh the display.

TIPS

- The indication appears only after the day advances on your computer's clock.
- The indication appears only for existing values that were changed at the last revision. If you enter a new value for a property that previously did not have a value, no change is indicated.

Format Field Values

1. Open a spec page in the **Page Editor**.
2. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .
3. On the **Edit Fields and Headers** toolbar, click  to display the data field names in the page.
4. In the page, double-click a field name to open the **Edit Field** dialog box.
5. Under **Alignment**, accept the default alignment (left), or select the appropriate alignment option.
6. Under **Font style**, select the font style (the available styles are bold and italic).
7. Under **Font size**, enter a font size between 3 and 24.
8. Select **Transparent** if you want to display the current Windows background color in the text box, or clear **Transparent** and then select the background color that you need.
9. Click **OK**.

Add Data Fields to a Page

1. Open a spec page in the **Page Editor**.
2. On the menu bar, click **Actions > Regenerate Page**.
3. On the **Regenerate Page** dialog box, under **Select tables and views**, select a check box for each table or view whose columns you want to display table in the **Table Column List** pop-up window, from which you can then add data fields to your page.
TIP If you want to add a user- defined view to a spec page, you must first add this view in the **Specification Views** dialog box.
4. Under **Show Columns**, click **Show** for each required table or view.
5. Under **Select columns**, do one of the following:
 - Select the **Select all** check box to select all the columns in the table.
 - Hold down the **Ctrl** key and select or clear specific columns as desired.
6. Click **OK** to return to the **Page Editor**.
7. On the menu bar, click **Actions > Edit Fields and Headers**.
8. On the **Edit Fields and Headers** toolbar, click  to open the **Table Column List** pop-up window.
9. From the **Table Column List** pop-up window, drag table columns to the appropriate location on the page.
10. Click  to close the **Table Column List** pop-up window.
11. Do one of the following:
 - To save the page under the current name, on the menu bar, click **Actions > Save**.
 - To save the page under a different name, on the menu bar, click **Actions > Save as Page**.

Duplicate Data Fields in a Page

1. Open a spec page in the **Page Editor**.
2. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .
3. On the **Edit Headers and Fields** toolbar, click  to display the data field names in the page.
4. In the **Page Editor** working area, click the data field that you want to duplicate.
5. On the **Edit Fields and Headers** toolbar, click .
TIP The software displays the duplicated data field as superimposed on the original field and skewed downwards to the right.
6. Drag the new field to the location that you need.

Delete Data Fields

1. Open a spec page in the **Page Editor**.
2. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .
3. With the **Edit Fields and Headers** toolbar displayed, in the page, click the data field that you want to delete.
4. On the **Edit Fields and Headers** toolbar, click .
5. Repeat this procedure to delete another data field.

Add Custom Fields of Wiring Equipment Items

1. Create a wiring equipment item in the **Reference Explorer**.
2. In the Specifications module, restore a form associated with the Wiring Equipment item type.
3. In the **Page Editor**, open a spec page based on the form that you restored.
4. Regenerate the page, and from the APPARATUS table, add the appropriate APPAR_UDF columns as data fields in the page.
5. In the page, name the column headers to match the headers that you defined for wiring equipment properties in the Wiring module.

TIPS

- To display a list of headers, you need to open an external .psr file WIRING_EQUIPMENT_UDF.PSR, which is located in the path <SmartPlant Instrumentation home folder> \PSR. You can open the file WIRING_EQUIPMENT_UDF.PSR using InfoMaker, or from the Browser module.
- After adding custom fields in a spec page, you have to change the column headers in the page so that they match the user-defined property names in the **Wiring Equipment Category Properties** dialog box, which you access for the Wiring module (with the **Wiring** module main window open, click **Tables > Wiring Equipment > Categories**).

See Also

Restore Library Forms (on page 228)

Regenerate a Specification Page (on page 205)

Add Function Block Custom Fields to a Fieldbus Spec

1. In the Instrument Index module, create a new function block.
2. In the Specifications module, open the **Page Editor**.
3. On the **Page Editor** toolbar, click .
4. On the **Select Specification Page** dialog box, select **Fieldbus Page**.
5. Do one of the following to display the **Edit Fields and Headers** floating toolbar:
 - Click **Actions > Edit Fields and Headers**.
 - On the **Page Editor** toolbar, click .
6. On the **Edit Fields and Headers** floating toolbar, click  to view the names of the data field on the specification page.

7. On the **Edit Fields and Headers** floating toolbar, click .
 8. In the **Table Column List** pop-up window, select a table column starting with the string **fb** and containing a value between 22 and 40, for example, **fb22_exists**. For each custom function block, the following column types are available:
 - **fb<number>_name** — Displays the text string used for the function block label as defined in the Function Blocks supporting table.
 - **fb<number>_count** — Allows you to specify the number of function blocks of the particular type that are used in the instrument if the **Multiple** check box is selected in the **Function Blocks** dialog box.
 - **fb<number>_ex_time** — Allows you to specify the execution time for the function block type if the **Execution time** check box is selected in the **Function Blocks** dialog box.
 - **fb<number>_exists** — Displays a text box that you can select to indicate that the function block is required for the instrument.
- TIP** The <number> value corresponds to the order in which you add custom function blocks in the Function Blocks supporting table, and not their alphabetic sequence.
9. Drag the table column value that you selected from the **Table Column List** pop-up window to the desired location on the currently open page.
 10. Drag other custom function block values onto the page as desired.
 11. Click  to close the **Table Column List** pop-up window.

SECTION 19

Spec Forms

Forms serve the basis for creating specifications. Forms can consist of one or more data pages and always contain a note page. A form must contain at least one data page. You might design a form based on more than one page, for example, for a field device that has both electrical and mechanical connections, requiring separate pages for wiring connections and line-related fields. SmartPlant Instrumentation is delivered with a library of predefined forms bearing the names of their default pages.

You can manage spec forms in the Specifications module, using the **Form Editor** options. You can change form properties, such as name, description, and number, save a form either as a new form or as a spec page to fit your own conventions.

After defining the form pages, you can create specs on the basis of this form. If you want to generate a multi-tag spec containing a page where you can display values of individual instruments. You must first create a multi-tag spec format on the basis of a particular form. You can create other types of specs by assigning a SmartPlant Instrumentation item directly to the number of the appropriate spec form. When you assign a form to an item and generate a spec, the software creates the spec pages according to the pages that the source form contains. You cannot modify the data fields in the form itself, only in the form pages, which you can open in the **Page Editor**.

It is possible to create multiple templates for a specific form and then, when generating a spec, assign the item to the form data template rather than to the form. You can then copy data from any other template based on the same form to the current spec, and even copy data from the spec to any of these templates.

Create a Form

Use this procedure to create a form comprising one spec page. You can only create and manage spec forms in the Specifications module.

1. In the **Specifications Module** window, do one of the following:
 - Click **Edit > Form Editor**.
 - On the toolbar, click .
2. In the **Form Editor**, click .
3. Select a page for the new form.

TIP A form must contain at least one page. You can add other pages in the form after creating the form.

4. On the toolbar, click  to save the form to the database.

Edit Form Properties

Use this procedure to create a form comprising one spec page. You can only create and manage spec forms in the Specifications module.

NOTE Before performing this procedure, make sure that you have closed all the specifications that are assigned to the form whose properties you want to edit.

1. In the **Specifications Module** window, do one of the following:
 - Click **Edit > Form Editor**.
 - On the toolbar, click .
2. In the **Form Editor**, do one of the following:
 - Click **Actions > Open Form**.
 - Click .
3. On the **Select Specification Form** dialog box, select the form whose properties you want to edit.
4. Click **Properties** and modify the form number, name, or note as you require.
5. Click **OK** and then save the form.

Add Pages to an Existing Form

Use the following procedure to add pages to existing forms and create a multi-page form that you can associate with an item. By adding pages to a form, you can achieve greater flexibility and accuracy in specifications based on that form.

IMPORTANT

- If you want to use large notes in a form, you need to add a large note page to this form. Since it is possible to scroll the large note page area, you do not need to add more than one large note page to a form. When printing forms containing a large note page, the software divides the page into separate sheets automatically, depending on the note text length.
 - A form that contains a composite page cannot contain any other pages because you can only include one composite page in a form.
1. In the **Form Editor**, do one of the following:
 - On the menu bar, click **Actions > Open Form**.
 - On the toolbar, click .
 2. On the **Select Specification Form** dialog box, select the form to which you want to add pages, and click **OK**.
 3. In the **Form Editor**, do one of the following to add a page:
 - On the menu bar, click **Actions > New Page**.
 - On the toolbar, click .
 4. On the **Select Specification Page** dialog box, select the page that you want to include in the form.

TIPS

- To edit the page name and description, click **Properties** and type the required modifications.

- The process function of the form is determined by the pages in the form. If the process function of all the pages within a form is General, the form process function is also General. If an added page has a different process function, the form process function changes to the new page process function. In this case, adding a new page is available only for pages with General or the same process function as the form.
5. Click **OK**.
 6. Sort the pages within the form as you require.
 7. Do one of the following:
 - To save the changes that you made, on the menu bar, click **Actions > Save**.
 - To save the form under a new name, on the menu bar, click **Actions > Save as Form**.

NOTES

- If you are building a form incorporating pages with identical custom field names, (for example, Page 1 and Page 2) the following scenario can occur:
On Page 1, the **spec_udf_c13** field value is **A**, whereas, on Page 2, the value is **B**. When adding Page 2 to the form, the software changes the **spec_udf_c13** value to **B** on **Page 1**, according to the value on **Page 2**.
- In a multi-page form, you should use a given specification custom field name on more than one page only for a field that you design for constancy across all of the form pages.

See Also

Create a Large Note Page (on page 207)

Specification Page Customization (on page 217)

Specification Pages (on page 203)

Remove a Page from a Form

You can remove a page from an existing multi-page form. This procedure only applies to the current form and does not remove the page from the list of pages available as templates for other forms. If you need to permanently delete a particular page, you can do so in the **Page Editor**.

1. In the **Form Editor**, open a form that has more than one page.
2. Click a tab of a specific page.
3. Do one of the following:
 - On the menu bar, click **Actions > Remove Page**.
 - On the toolbar, click .
4. Do one of the following:
 - To save the form under the existing name, click **Actions > Save**.
 - To save the form under a new name, click **Actions > Save as Form**.

Sort Pages Within Forms

Use this procedure to open a specific form and sort the pages included in the form. This way you set the print preview and print order of the pages in a spec that you generate on the basis of this form.

1. In the **Form Editor**, open a form that has more than one page.
2. Do one of the following:
 - On the menu bar, click **Actions > Sort Pages**.
 - On the toolbar, click .
3. Select a page and click **Move Up** or **Move Down** to change the page order within the form.

4. Click **OK** to set the new page order and update the form.

Display a List of Pages Included in a Form

Use this procedure to open a form and display a list of spec pages that this form includes. You might need to display a list of pages of you want to modify fields in a specific form page (you cannot modify fields on the form itself).

1. In the **Specifications Module** window, do one of the following:
 - Click **Edit > Form Editor**.
 - On the toolbar, click .
2. On the **Form Editor** menu bar, do one of the following:
 - Click **Actions > Page List** to view the page list.
 - Click **Reports > Spec Pages per Form** to generate an d print a report of the form pages.

Delete a Form

This procedure enables you to delete a form that is not in use in any spec. You can either delete the form together with all of the pages included in the form, or just the form itself, and then delete the pages manually, from the **Page Editor**. If the form that you are about to delete is a library form, you can restore this form at any stage, together with the library pages.

1. On the **Form Editor** menu bar, click **Actions > Delete Form**.

TIPS

- You can only delete a form that is not in use in any specs.
 - You can delete one form at a time.
 - If the form has pages, and it is not in use in any spec, you are prompted to delete all of the form pages as well. If the form that you are about to delete is a library form, you can restore this form at any stage, together with the library pages. However, you cannot restore custom pages included in the form. Therefore, before deleting the form, we recommend that you save the appropriate pages as external files. You can save pages as files in the **Page Editor**.
2. On the **Select Specification Form** dialog box, select the form you want to delete and click **OK**.

Restore Library Forms

Use this procedure if you need to perform any of the following activities:

- Activate a library form that is not available in the **Select Specification Form** dialog box. After you restore a form, this form becomes available in the **Select Specification Form** dialog box, and you can associate this form with items that belong to a specific item type. You must restore all forms whose item type is not Instrument if you want to create specifications using these forms. For example, to create hook-up specifications, you must restore a form assigned to the hook-up item type.
 - Restore a library form after deleting it. You can only restore library forms provided with SmartPlant Instrumentation. You can only restore a library form that was saved as an .isf file.
1. In the **Specifications Module** window, do one of the following:
 - Click **Edit > Form Editor**.
 - On the toolbar, click .

2. On the **Form Editor** menu bar, click **Actions > Restore Form**.
3. Select the form you want to restore and click **OK**.

TIP If the form with the same name you are restoring already exists, the software displays the **Restore Options** dialog box, where you can overwrite the existing form or re-create the library form as a new form.

Regenerate Library Forms

You might need to use this procedure after your System Administrator has initialized a new domain from a source, or after upgrading your SmartPlant Instrumentation database. Some form data may not be copied correctly to the target domain. For this reason, it is recommended that you regenerate the library forms to avoid any problems at a later stage. If you are using the workflow options in the Instrument Specifications Browser, regeneration is essential after initialization or upgrade.

1. In the **Specifications Module** window, click **Actions > Regenerate Library Forms**.
2. On the **Regenerate Library Forms** dialog box, click **Run**.
3. On completion of the process, click **Close**.

Change the Form Assignment of a Spec

Use this procedure to change the form assignment for a group of specs that share a common form. The new form must have the same process function as the currently assigned form or belong to the General process function.

1. In the Specifications module open a specification.
2. On the menu bar, click **Actions > Change Spec Form**.
3. Select the new form for your specification and click **OK**.
4. When prompted to change the form assignment and close the current spec, click **Yes**, and then reopen the spec, which is now assigned to the new form.

TIPS

- SmartPlant Instrumentation does not allow you to change the form assignment of a spec assigned to a Specification Binder package, unless you first remove the specification from the Specification Binder package.
- SmartPlant Instrumentation does not allow you to change the form assignment of a multi-tag spec.

Change Form Assignment for a Batch of Specs

Use this procedure to change the form assignment for a particular spec. The new form must have the same process function as the currently assigned form. When the spec item type is Instrument, you can also select a form whose process function is defined as General.

1. In the **Specifications Module** window, on the menu bar, click **Actions > Change Spec Form**.
2. Under **Search parameters**, from the **Current form** list, select the form type of the specifications that you want to change.
3. Click **Find**.

TIPS

- Select **Find typical tags only** to limit your search to specifications of typical tags.
 - Select **Find telecom tags only** to limit your search to specifications of telecom tags.
4. Under **Search results**, select the specifications for which you want to change the form.

5. Under **Change parameters**, from the **New form** box, select the new form type, and click **Apply**.

TIPS

- In the **New form** box, the software displays forms of the same process function as the current form. When the spec item type is Instrument, the software also displays forms whose process function is defined as General.
 - Specifications for which forms were successfully changed no longer appear among the search results.
 - The software does not allow you to change the form assignment of an instrument specification assigned to a Specification Binder package, unless you first remove the specification from the Specification Binder package.
 - SmartPlant Instrumentation does not allow you to change the form assignment of multi-tag specs.
6. Repeat the procedure for other specification forms if required, or click **Close** to return to the **Specifications Module** window.

Define Form Browser Fields

Use this procedure to define fields for a single-form browser or multi-form browser you can add in the Browser module. The fields that you select in the **Spec Data Dictionary** become available for inclusion in the browser view in the **Style settings** section of the **Browser Manager**. You can edit the field headers only in the **Spec Data Dictionary**. This procedure does not affect the on-screen display of specifications based on a form that you edit in the **Spec Data Dictionary**, nor does it influence printed specifications.

NOTES

- This procedure is a prerequisite for adding a single-form browser using the Browser module options.
 - This procedure is a prerequisite for defining a multi-form browser using the Specifications module options.
1. On the **Specifications Module** window menu bar, click **Edit > Spec Data Dictionary**.
 2. On the **Select Specification Form** dialog box, select a form and click **OK**.
 3. On the toolbar, click .
 4. To edit the headers for the form browser, if you need, do one of the following:
 - On the **Field Properties** tab, change individual field headers by typing a text string instead of the displayed header.
 - Change field headers in batch mode using another form as a source. To do so, click **Copy From**, and then, select a source form..
 5. To apply existing headers of the current form, do the following:
 6. In the form or on the **Field Properties** tab, under **Header**, move the cursor to the field header.
 7. After the cursor changes its shape to , click the header.
 8. In the form, double-click the header to display it on the **Field Properties** tab.

TIPS

- When you apply existing headers of the current form, in the form display, the form fields are marked with the cyan background color. The background color of the currently selected field, for which you are editing the header, changes to magenta.

- The  icon on the **Field Properties** tab points to the corresponding field header, which is now available for editing.
9. To define the fields for the form browser, do one of the following:
 - To make all of the fields from one or more tables available for the form browser, click the **Tables** tab, and then, under **Browser Fields**, click **All** for the tables that you require.
 - To define individual fields, on the **Field Properties** tab, select the appropriate check boxes in the **Browser** column.
 10. On the toolbar, click  (**Generate**) to generate a form browser format.

TIP When defining fields for a multi-form browser, you do not need to generate any browser format. It is sufficient to save the definitions you made.
 11. On the toolbar, click  to save the form browser field definitions.

Define a Multi-Form Browser

Use this procedure to define a multi-form browser after you specified fields for the browser in the **Spec Data Dictionary**.

Prerequisite

Before defining a multi-form browser, you must define form browser fields in the **Spec Data Dictionary**. For details, see *Define Form Browser Fields* (on page 230).

CAUTIONS

- If you need to redefine fields for an existing multi-form browser that already has browser created views created in the Browser module, note that on re-creating the browser, the software automatically deletes all the existing views.
 - On a multi-user database platform, before re-creating a multi-form browser, you must first make sure that other users have no views open for this browser. Re-creation of an existing browser when its view is open on another machine results in unstable software behavior and the software might close unexpectedly on the machine where the browser view is open.
1. In the **Specifications Module** window menu bar, click **Define Multi-Form Browser** to open the **Define Multi-Form Browser Wizard**.
 2. On the **Welcome** page, click **Next**.
 3. On the **Browser Name Definition and Selection** page, do the following:
 - a. Beside browser, click the ellipsis button .
 - b. On the **Multi-Form Browsers** dialog box, click **New** and then type a unique browser name and an optional description.
 - c. Click **OK** to close the **Multi-Form Browsers** dialog box and return to the **Browser Name Definition and Selection** page.
 - d. Make sure the browser name appears in the **Browser** box and then click **Next**.
 - e. On the **Item Type Selection** page, select the specification form item type and then click **Next**.

TIP At this stage, the software assigns the browser name to the form item type.
 4. On the **Specification Form Selection** page, select check boxes for those spec forms whose fields want to include in the current browser.
 5. Click **Next**.
 6. On the **Field Header Selection** page, do the following:

- a. If needed, click **Filter** and then specify the filter for displaying the field headers that you require.
 - b. Under **Field headers**, select the field headers you want to display in the browser view as column names.
7. Click **Next**.
8. On the **Multi-Form Browser Creation** page, click **Finish**.
9. Test the multi-form browser in the Browser module. For details, see *Test a Multi-Form Browser* (on page 587).

Form Data Templates

Form data template allows you to store data that you can copy to existing specs. Using a form data template eliminates the need to repeat data entry for similar specs. Also, you can set the software to copy data from a template when generating a new instrument spec. This is possible after you assign an existing form data template to the profile of a specific instrument type. You manage form data templates only in the Specifications module, in the **Form Data Template Editor**.

You base form data templates on a specific spec form. You can create multiple templates for each form. The form data template name does not have to be unique and can contain up to 50 alpha-numeric characters. After generating a spec based on the form for which you defined data templates, you can select a template and copy its data to the spec. Also, you can copy data to a form data template from a spec based on the same form.

Create and Modify a Form Data Template

Use this procedure to create and modify form data templates, from which you can copy a batch of data to your new or existing specifications.

1. With the **Specifications Module** window open, click **Edit > Form Data Template Editor**.
2. On the **Select Specification Form** dialog box, select the form for which you want to create or modify a form data template, and then click **OK**.
3. On the **Select Form Data Template** dialog box, do one of the following:
 - If this is the first form data template for the current form, type a meaningful name instead of **UNDEFINED**.
 - To add an additional form data template for the current form, click **New** and type a name.
 - To modify an existing form data template, select the template from the list.
4. Click **OK** to open the template in the **Form Data Template Editor**.
5. Do one of the following to enter data in the form template:
 - Enter data manually in the fields that are available for editing.
 - Copy data from a spec based on the same form as your form data template. For details, see *Copy Data to a Form Data Template from a Spec* (on page 272).

TIP If the form data template has fields that are not accessible, these fields are protected in the **Spec Data Dictionary**. You cannot enter values in protected fields. When copying data, the software ignores protected fields. For details, see *Protect Fields from Overwriting When Copying Data* (see "Protect Fields from Being Overwritten When Copying Data" on page 272).

6. On the toolbar, click  to save the changes.

7. If needed, on the toolbar, click  to define and open another form data template in the **Form Data Template Editor**.

TIPS

- If you opened several templates in the **Form Data Template Editor**, you can display the template that you require by selecting it on the **Window** menu.
- We recommend that you define unique and meaningful names for your form data templates. The software does not check whether the template names are unique.

Delete a Form Data Template

Use this procedure to delete one or more form data templates if they are no longer required as data sources for specs.

1. In the Specifications module, click Actions > Delete Form Data Template.
2. In the Select Specification Form dialog box, select the form for which you want to delete a form data template and click OK.

TIP The Select Specification Form dialog box only displays those forms for which you have defined data templates.

3. In the Select Form Data Template dialog box, select one or more data templates that you want to delete.

TIP To select multiple records, use the mouse while holding down the Ctrl or Shift key, or select the Select all check box.

4. Click OK
5. Click Yes when prompted to confirm the deletion.

TIPS

- Deleting a form a data template does not affect the source spec form or specs to which you copied data from the template.
- Deletion of a form data template is irreversible.

SECTION 20

Single-Tag Specifications

A single-tag spec is a specification you can generate for a single instrument. A single-tag can only contain data defined for one specific instrument. If you want to use this tag in a multi-tag spec, you need to delete the single-tag spec first. A single tag spec consists of a note page, and one or more data pages, depending on the form on which you base the spec.

In the specification, you can edit some of the fields by clicking inside the field and typing the required data. Other fields, such as **Tag Number** or **Process Conditions** receive their data from the Instrument Index, Process Data or Calculation modules and thus do not allow a direct editing. However, you can edit the process data and calculation fields if you have been granted the appropriate access rights to do so. The unit of measure fields allow you to select values from a predefined list of units. All tag number property changes that are made not in the spec itself automatically take effect in the spec generated for this tag.

It is possible to export single-tag specs to External Editor, where other users can edit the appropriate data settings, and then import the edited data back to SmartPlant Instrumentation.

NOTE If a single-tag spec has fieldbus columns, you can set preferences to allow you to edit the fieldbus column values in the spec. However, you can only make the fieldbus columns editable if the instrument type of the spec tag number is Fieldbus.

Generate a Single-Tag Spec

This procedure describes how to generate a single-tag spec for an existing instrument using the Specifications module options.

1. In the Specifications Module window, click **Actions > Open Specification**
2. From the **Item type** list, select **Instrument**.
3. From the **Tag class** list, select a tag class.
4. In the **Item number** box, enter the exact instrument tag number.

TIPS

- If you do not remember the instrument tag number, leave the **Item number** box empty and click **Find**.
 - If you are creating a specification for a specific process data case of an instrument, the value in the **Form number** box might be view-only. If the value is view only, you have already created previously a specification for a different case of the same instrument. After creating a spec for a process data case, the software assigns the same spec form to all other cases of the same instrument.
 - If the instrument process function is General, the available forms are only those whose process function is also General. However, if the instrument process function is not General, both General forms and forms that have the same process function as the tag has are available for association with the instrument.
5. In the **Form number** box, enter the spec form number.
TIP If you do not remember the form number, leave the **Form number** box empty and click **Find**.
 6. In the **Open Specification** box, click **OK**.

TIP If you receive a message that the specified instrument tag does not exist, you can create a new instrument tag on the fly, provided that you set preferences accordingly. To be able to create instrument tags in the Specifications module, on the **Preferences** dialog box, on the **Specifications > General** page, under **Tag creation**, select **Allowed**.

7. In the **New Specification** dialog box, do one of the following:
 - a. Select **Create single-item specification**.
 - b. In the **Document number** box, accept the default document number or modify it as you require.

TIP You do not have to define the document number at this stage. If you leave the **Document number** box empty, you can define the document number in the spec title block of the spec, after you open the spec.

8. Click **OK** to generate and open the specification.

See Also

Generate Instrument Specs in Batch Mode (on page 198)

Principles of Generating Specifications (on page 195)

Notes for Editing a Single-Tag Spec

This topic provides information about the editing options you can use if you need to update or define data in the columns of a given single-tag spec.

Field Values

Some field values can be edited by clicking inside the field and typing the required data. Some of the fields require that you select a value from a list. Other fields, such as **Tag Number** or **Process Conditions** receive their data from the Instrument Index, Process Data, or Calculation modules and thus do not allow a direct editing. You can only edit process data and calculation values if you have the appropriate access rights to do so.

Units of Measure

The **Units of Measure** (UOM) fields allow you to select a unit from a predefined list of units. After selecting a pressure unit, you are prompted to choose the pressure reading method. When you select volumetric flow units, you are prompted to select the measurement conditions (at flow or at base).

Spec Sheet Number

At the foot of the specification, you can enter the sheet number and total number of sheets manually. You can leave these fields blank to complete them automatically when you print the sheets.

Document Binder Status

When you edit and save an instrument specification that is part of a Specification Binder package in the Document Binder module, you are prompted to define its Document Binder status.

Edit Manufacturers and Models in a Spec

Use this procedure to edit the instrument manufacturer and model in a spec. With a spec open, you can display the instrument manufacturer supporting table and define the manufacturers and models as you require.

1. Open a spec.
 2. Do one of the following:
 - Click **Actions > Instrument Models**.
 - On the toolbar, click .
 3. To add or change a manufacturer, in the **Instrument Manufacturers** dialog box, under **Manufacturer**, select a manufacturer from the list or click  to add a new manufacturer.
 4. To change the instrument model, in the data window of the dialog box, select the new model.
 5. To add a new model for the current manufacturer, do the following:
 - a. In the **Instrument Manufacturers** dialog box, click **New** to add a new data row.
 - b. Type the instrument model values in the appropriate boxes, and also select the process function.
 - c. Click **OK**.
- NOTE** The software automatically copies the defined instrument manufacturer and model to the appropriate fields in the current spec.
6. Save the specification.

Move a Single-Tag Spec to a Multi-Tag Spec

IMPORTANT When moving a single-tag spec to a multi-tag spec, the software only copies the data that appear in the current see list. If the single-tag spec contains data that appears on the main pages of the current multi-tag spec (not in the see list), the software ignores these values, and automatically deletes the single-tag spec and its document number.

1. Open a multi-tag spec.
2. Click the **Multi-Tag List** tab.
3. Click **Actions > Move from Single**.
4. In the **Add Tag** dialog box, click **Find**.
5. In the **Find Items** dialog box, search for the tags whose spec form is the same as the form in the current multi-tag spec.
6. Under **Search results**, select one or more tags, and then click **OK**.

TIPS

- In the **Find Items** dialog box, the **Process function** and **Form number** boxes are view-only because all the target single-tag specs must be based on the same form as the format of the current multi-tag spec and share the same process function.
- If you know the target spec tag number, you can type it in the **Add Tag** dialog box, and click **OK** to add this tag in the current see list.
- All the target single-tag specs must be based on the same form as the format of the current multi-tag spec.

See Also

Move a Tag to Another See List (on page 249)

Generate a Spec for a Complex Analyzer

Use this procedure to generate a specification for a complex analyzer.

1. Make sure that you have a specification form appropriate for an analyzer.

TIPS

- The library form #77 is an example of a form designed for an analyzer. If this form is not displayed in the **Select Specification Form** dialog box, restore the supplied library forms.
 - You can also generate a multi-tag spec for each stream of a complex analyzer.
 - You can also use this procedure to generate a spec for a simple analyzer.
2. Generate a single-tag spec based on the analyzer form.

See Also

Generate a Single-Tag Spec (on page 235)

Generate a Spec for an Analyzer Stream (on page 251)

Associate an Instrument Tag with Several Specification Forms

You can associate an instrument tag with several specification forms and set an active specification for that tag number. Note that each specification is based on a particular document (drawing) that is defined for the form of the specification you select. The specification can be a single-tag or a composite specification but not a multi-tag specification.

IMPORTANT

- For this feature to work, you must first enable it in the **Specification Preferences**. Click **File > Preferences**. On the **Preferences** dialog box, click **Specifications > General**. Under **Instrument specification association**, select the **Associate with multiple spec forms** option.
 - The software does not allow you to associate a specification form that is based on a document included in a Document Binder package.
 - The software does not allow you to associate a specification form that is used in a multi-tag specification.
1. In the Specifications module, click **Actions > Associate Instrument Specification Forms**.
 2. On the **Enter Specification Tag Number** dialog box, select an appropriate tag class.
 3. With the mouse pointer in the **Tag number** box, type in the tag number that you require or do the following:
 - a. Click **Find** to open the **Find Items** dialog box.
 - b. In the boxes in the upper part of the dialog box, type or select the parameters for the properties that you want to find.
 - c. Click **Find** to display a list of items according to the search parameters that you have selected.
 - d. Select the required item from the retrieved list.
 - e. Click **OK** to accept your choice. and return to the **Enter Specification Tag Number** dialog box.
 4. On the **Enter Specification Tag Number** dialog box, click **OK**.
 5. On the **Associate Instrument Specification Forms** dialog box, click **Add Form**.
 6. On the **Select Specification Form** dialog box, highlight a form and click **OK**.

NOTE The software adds the form you selected to the **Additional associated forms** list on the **Associate Instrument Specification Forms** dialog box.

7. If the current instrument tag has several process data cases, select the required case from the list and then repeat steps 5 and 6 as needed.

NOTE The software will prompt you to save the association data if you do not click **Apply** before changing the case.

8. To change the active specification for the current instrument tag, select a form in the **Additional associated forms** list and click **Set Active Form**.

NOTES

- Click **Dissociate** if you want the current instrument tag not to be associated with any specification form. After clicking this button, software clears values in the **Active specification details** box and moves the form to the **Additional associated forms** list. You can set another active specification by selecting an appropriate form in the **Additional associated forms** list and clicking **Set Active Form**.
- To remove an associated form from the list, select a form in the **Additional associated forms** list and click **Remove**.

SECTION 21

Process Data Case Specs

A process data case specification is a single-section specification generated for a particular process data case of an instrument tag. You can create an individual specification for each case of an instrument tag, including the governing case. Each process data case spec has its own revisions. Process data case specifications do not have to share the same document number (as for other specifications).

You create process data case specifications in the same way that you create specifications for other items. Since all process data case specifications share the same tag number, creation of a process data case specification involves an additional step, that is selecting the desired tag case. After you specify a tag number for creating a new spec, the software automatically detects whether this tag number has multiple cases and prompts you to select one of those cases.

Since all process data case specifications for a given instrument share the same spec form, after creating the first specification for a particular case, you need to use the same spec form for all subsequent process data case specifications that you create for the instrument.

NOTE It is possible to generate a composite (multi-section) specification that displays more than one process data case of an instrument. For details, see *Composite Spec for Instrument with Cases: Generation Workflow* (on page 261).

Process Data Case Specifications Common Tasks

The following tasks deal with generating single-section specs for a particular process data case, or generate a hybrid case spec.

Generate a Spec for Multiple Process Data Cases

Use this procedure to generate a spec for a specific process data case defined for an instrument that contains case. For more information, see *Generate a Spec for Multiple Process Data Cases* (on page 242).

Generate a Hybrid Case Spec

For a control valve for which you defined multiple process data cases, you can create a hybrid case from the minimum, normal, and maximum flow coefficient values (Cv/Kv) that you calculated for the various cases. Use this procedure to generate a specification for this tag based on its hybrid case. Make sure that you have a form designed for the control valve hybrid case. For more information, see *Generate a Hybrid Case Spec* (on page 242).

Generate a Spec for Multiple Process Data Cases

1. In the Specifications module, click **Actions > Open Specification**.
2. On the **Open Specification** dialog box, from the **Item type** list select **Instrument**.
3. With the mouse pointer in the **Item number** box, do the following:
4. Click **Find** to open the **Find Items** dialog box.
 - a. In the boxes in the upper part of the dialog box, type or select the parameters for the properties that you want to find.
 - b. Click **Find** to display a list of instruments according to the search parameters that you have selected.
5. Select the instrument tag for which you have calculated a hybrid case in the Calculation module.

TIP Under **Search parameters**, the **Case** list displays all the available cases defined in the Process Data module.
6. On the **Find Items** dialog box, click **OK** to accept your selection and return to the **Open Specification** dialog box.
7. With the mouse pointer in the **Form number** box, do the following:
 - a. Click **Find** to open the **Select Specification Form** dialog box.
 - b. Select the appropriate form (not form #76, which designed for the control valve hybrid case), and then click **OK**.

TIP If the value in the **Form number** box is view-only, this means that you have already created previously a specification for a different case of the same tag. After creating a spec for a tag case, the software assigns the same spec form to all other cases of the same tag.
8. On the **Open Specification** dialog box, click **OK** to open the **New Specification** dialog box, and then proceed with spec creation.

Generate a Hybrid Case Spec

1. In the Specifications module, click **Actions > Open Specification**.
2. On the **Open Specification** dialog box, from the **Item type** list select **Instrument**.
3. With the mouse pointer in the **Item number** box, do the following:
 - a. Click **Find** to open the **Find Items** dialog box.
 - b. In the boxes in the upper part of the dialog box, type or select the parameters for the properties that you want to find.
 - c. Click **Find** to display a list of instruments according to the search parameters that you have selected.
4. Select the instrument tag for which you have calculated a hybrid case in the Calculation module.

TIP Under **Search parameters**, the **Case** list displays all the available cases defined in the Process Data module. However, the software does not indicate in the interface those instruments for which you calculated a hybrid case.
5. On the **Find Items** dialog box, click **OK** to accept your selection and return to the **Open Specification** dialog box.
6. With the mouse pointer in the **Form number** box, do the following:
 - a. Click **Find** to open the **Select Specification Form** dialog box.

b. Select the form #76, which designed for the control valve hybrid case, and then click **OK**.

TIP The library form #76 is the library form supplied with SmartPlant Instrumentation. This form contains columns that display minimum, normal, and maximum flow coefficient values (Cv/Kv) you calculated for the various cases in the Calculation module. If this form is not displayed in the **Select Specification Form** dialog box, restore the supplied library forms.

7. On the **Open Specification** dialog box, click **OK** to open the **New Specification** dialog box, and then proceed with spec creation.

See Also

Restore Library Forms (on page 228)

SECTION 22

Multi-Tag (See List) Specifications

A multi-tag specification is a specification you can generate for a group of instruments. Multi-tag specifications are frequently required because instruments of the same type have many identical parameters. A multi-tag specification contains a group of instrument tags that you can add, one by one, to the same spec sheet. A multi-tag specification is based on a specification format, which is, in turn, is based on the form that you set for assigning with multiple tags. Such a form can comprise one or more spec pages.

Instrument tags in a multi-tag spec must have identical process functions except for the following case: if the spec form process function is General but the form pages do not include any data fields from the PD_NOT_ASSIGN or PD_GENERAL tables, such a spec can contain instruments whose process functions are not identical, for example, such a spec can contain both Flow and Temperature instruments.

A multi-tag specification always contains one **Notes** page, one **Multi-Tag List** page, and one or more common pages with fields that are identical for all of the tags. The **Tag Number** field, and other specification fields that appear on the **Multi-Tag List** page, show the words SEE LIST instead of data. The SEE LIST label indicates that the values in the fields appear on the **Multi-Tag List** tab of the spec. The **Multi-Tag List** page contains fields whose values can differ from tag to tag. You can change the SEE LIST label to any other text using the appropriate option on the **Multi-Tag Specifications** page of the **Preferences** dialog box.

It is possible to export multi-tag specs to External Editor, where other users can edit the appropriate data settings, and then import the edited data back to SmartPlant Instrumentation. Also, you can move tags to another multi-tag spec (to another see list), or, on removing a tag, automatically generate a single-tag spec for this tag. You cannot remove the master tag.

NOTES

- You can include fieldbus instruments in a multi-tag spec. However, the software does not support editing of fieldbus data fields in a multi-tag spec.
- You cannot include composite pages in a multi-tag spec. For details of composite specs, see *Composite Specifications* (on page 259).

Generate a Multi-Tag Spec

Use this procedure to generate and open a multi-tag spec in the Specifications module. To generate such a spec, you need to select a specific instrument and a form for which you created a multi-tag spec format. After generating the spec, you can add other instrument tags to the spec see list.

NOTE Before you can perform this procedure, make sure you created a multi-tag spec format for a spec form you need to associate with the instrument for which you want to create the spec.

1. In the Specifications Module window, click **Actions > Open Specification**.
2. From the **Item type** list, select **Instrument**.
3. In the **Item number** box, enter the exact instrument tag number that you want to define as the master tag in your multi-tag spec.

TIPS

- If you do not remember the instrument tag number, leave the **Item number** box empty and click **Find**.

- If you are creating a specification for a specific process data case of an instrument, the value in the **Form number** box might be view-only. If the value is view only, you have already created previously a specification for a different case of the same instrument. After creating a spec for a process data case, the software assigns the same spec form to all other cases of the same instrument.
 - If the instrument process function is General, the available forms are only those whose process function is also General. However, if the instrument process function is not General, both General forms and forms that have the same process function as the tag has are available for association with the instrument.
4. In the **Form number** box, enter the spec form number of the form for which you created a multi-tag list format.
TIP If you do not remember the form number, leave the **Form number** box empty and click **Find**.
 5. In the **Open Specification** box, click **OK**.
 6. In the **New Specification** dialog box, do one of the following:
 7. Select **Create multi-tag specification**.
 8. In the **Document number** box, accept the default document number or modify it as you require.
TIP The document number that you define applies to the entire multi-tag specification, regardless of the number of instruments you subsequently add in the current spec see list.
 9. Click **OK** to generate and open the specification.
TIP After generating the multi-tag spec, you can add other instrument tags to the spec directly from the spec see list, without having to perform the current procedure again.

See Also

Multi-Tag Spec Formats (on page 251)

Generate Instrument Specs in Batch Mode (on page 198)

Principles of Generating Specifications (on page 195)

Add a Single Instrument Tag to a Multi-Tag Spec

Use this procedure to add an instrument tag to the see list of an existing multi-tag spec without opening the spec.

1. In the **Specifications Module** window, the menu bar, click **Actions > Open Specification**.
2. Select an instrument tag that is not yet associated with a specification by doing one of the following:
 - In the **Item number** box, type the tag number.
 - Click **Find** to search for the tag number that you require.
3. Select the spec form by doing one of the following:
 - In the **Form number** box, type the form number.
 - Click **Find** to search for the form that you require.
4. Click **OK**.
5. In the **New Specification** dialog box, select **Add tag to existing multi-tag specification**.
6. In the **Document numbers** pane, select the document number of the target multi-tag spec, with which you want to associate the current instrument tag.
TIPS
 - To display the selected multi-tag specification, click **View**.

- All the documents in all of the existing lowest level plant groups are displayed in the **Document numbers** pane. Therefore, you can select a document to add the instrument tag to a multi-tag spec belonging to any of the existing plant groups.
7. Click **OK** to open the specification.
 8. On the toolbar, click  to save the specification.

See Also

Multi-Tag Spec Formats (on page 251)

Add Instrument Tags to a Multi-Tag Spec in Batch Mode

Use this procedure to add one or more instrument tags to the see list of an existing multi-tag spec. To add instrument tags in batch mode, you must first open the target spec.

1. Open a multi-tag spec.
2. Click the **Multi-Tag List** tab to display the instrument tags that exist in the current see list.
3. Do one of the following:
 - To add instrument tags that currently are not associated with any spec, on the menu bar, click **Actions > Add Tag**.
 - To move instrument tags from existing single-tag specs, on the menu bar, click **Actions > Move from Single**.
4. On the **Add Tag Number** dialog box, click **Find** and then, search for the instrument tags that you can add to the current spec.
5. Under **Search results**, select the tags that you require, and then, click **OK** to return to the **Add Tag Number** dialog box.
6. On the **Add Tag Number** dialog box, click **OK**.
7. On the toolbar, click  to save the specification.

See Also

Multi-Tag Spec Formats (on page 251)

Edit See List Data in a Multi-Tag Spec

Use this procedure to edit data in the see list of a multi-tag spec.

1. Open a multi-tag spec.
2. Click the cell in which you want to add or edit data.
3. Modify the existing value or define a new value.
4. Save the spec.

TIPS

- You can only edit or define the see list values per specific cell.
- On main data pages of a multi-tag spec, you can edit spec fields that are common to all the tags, in the same way that you edit a single-tag spec.

See Also

Notes for Editing a Single-Tag Spec (on page 236)

Multi-Tag Spec Formats (on page 251)

Change the Master Tag Definition

In a multi-tag specification, several instrument tags have one common master page, which is generated according to one of the instrument tags sharing this specification. The master page is associated with a master tag which links to the information common to all instrument tags that belong to the multi-tag specification. You can change the master tag definition by selecting a different instrument tag to serve as the master tag. The master tag definition also changes if you delete the current master tag. In this case, the instrument tag that appears first in the see list becomes the master tag.

1. In the Specifications module, click **Actions > Change Master Tags**.
2. In the **Change Master Tags** dialog box, under **Document numbers**, select a document number.
3. In the **Tag numbers** pane, beside the tag number you want to set as the master tag, select the **Master** check box.
4. Click **Apply** to set the selected tag as the new master tag.

TIPS

- If you cannot find the document number in the **Change Master Tags** dialog box, this means that the spec you are looking for does not contain a document number. You need to open the target spec and define the document number in the spec title block.
- The master tag definition also changes if you delete the current master tag. In this case, the instrument tag that appears first in the see list becomes the master tag.

See Also

Ways of Defining a Spec Document Number (on page 201)

Multi-Tag Spec Formats (on page 251)

Search for a Specific Tag in a Multi-Tag Spec

Use this procedure to find a specific instrument tag within a multi-tag specification.

1. In a multi-tag spec, click the **Multi-Tag List** tab to display the see list.
2. Accept the default sort order or define a new ascending sort order by double-clicking the header on any column in the see list to set a new ascending.

TIPS

- The default sort order is by tag number in ascending direction. When you double-click a column heading, the arrow indicates the sort key and direction. You can click the same column already change the sorting direction.
 - The master tag definition also changes if you delete the current master tag. In this case, the instrument tag that appears first in the see list becomes the master tag.
3. If you have not yet found your tag, on the toolbar, click  and do one of the following:
 - Type the target tag number.
 - Click **Find** to open a dialog box where you search for the tag.

See Also

Multi-Tag Spec Formats (on page 251)

Change the Font Size of See List Column Headers

This procedure allows you to modify the font size and height of the see list column headers used in all multi-tag specs based on a specific format. You can customize the column header font size and height, and also the column name font size and height.

1. With the Specifications module window open, do one of the following:
 - On the toolbar, click .
 - On the **Edit** menu, click **Format Editor**.
2. Click **Actions > Customize Format**.
3. In each of the spin boxes, set the values as appropriate.

TIPS

- The **Sample header font size** and **Sample header height** boxes allow you to add values in PowerBuilder units (1 PowerBuilder unit is equivalent to 1/32 of the current system font height used in Windows).
 - The **Sample field font size** and **Sample field height** boxes allow you to add values in pixels.
4. Click **OK**.

TIP The changes you made in the font size will take effect only after you reopen the multi-tag list format you are currently editing.

See Also

Multi-Tag Spec Formats (on page 251)

Move a Tag to Another See List

Use this procedure to move instrument tags from the see list page of the currently spec to a see list in another spec. You can either create a new multi-tag spec on the fly and move instrument tags from the currently open see list to the target see list in another specification, or move tags to the see list of an existing multi-tag specification.

1. Open a multi-tag spec.
2. Click the **Multi-Tag List** tab to display the see list.
3. Select the instrument tags you want to move to another multi-tag spec.
4. On the menu bar, click **Actions > Move to Another Multi-Tag List**.
5. On the dialog box that opens, under **Select target format**, select a format.

TIPS

- The **Select target format** displays all the formats that you can use to create multi-tag specs. You can select either the format of the currently open specification and then create a new specification, or select a different format.
 - If a format appears without the  icon, this means that there are no multi-tag specs assigned to this format, or that this is the format of the current spec. In this case, you can only create a new multi-tag spec, and move the instrument tags from the current see list to the see list of the new spec.
 - If you want to move instrument tags to an existing spec, select a format that already has a multi-tag spec (that is, a format that has a  icon to the left of the format name).
6. Depending on the format that you selected, do one of the following:
 - If the selected format is different from the current format, and already has a multi-tag spec, select either **Move to new multi-tag instrument specification** or **Move to existing multi-tag instrument specification**.

- If you selected the current format or a format that does not have multi-tag specs, select **Move to new multi-tag instrument specification**, enter a document number for the new spec, and also, from the **Master tag** list, select a tag number which you want to set as the master tag in the new spec.

See Also

Multi-Tag Spec Formats (on page 251)

Move a Tag from See List to a Single-Tag Spec

Use this procedure to remove an instrument tag from a multi- tag spec and create a single-tag spec for this instrument.

1. Open a multi-tag spec.
2. Click the **Multi-Tag List** tab.
3. Select one or more tags and click **Actions > Move to Single**.

TIPS

- If you selected multiple tags, on the **Specifications > Multi-Tag Specifications** page of the **Preferences** dialog box, you can select **Skip individual confirmation**.
- You cannot move the master tag.
- The form number of the created single-tag specs is the same as the form number of the current multi-tag spec.
- The software automatically creates individual document numbers for each single-tag spec. The created tag numbers depend on whether the spec document number naming convention exists. If it does not exist, the software creates spec document numbers as follows: <<item tag>>-SP.

See Also

Multi-Tag Spec Formats (on page 251)

Remove a Tag from a Multi-Tag Spec

Use this procedure to remove instrument tags from a multi- tag (see list) specification. When removing a tag, it is possible to retain in the database or delete the tag spec data defined in the see list.

1. In a multi-tag specification, on the **Multi-Tag List** tab, select the instrument tags that you want to remove from the see list.
2. On the **Actions** menu, click **Remove Tag**.
3. In the message that opens, click **Yes** when prompted to remove the tags.
4. When prompted to clear the specification data, do one of the following:
 - Click **Yes** to delete from the database the see list values defined for the tag.
 - Click **No** to preserve the tag see list values in the database.

TIP If you clicked **No**, and then generate a specification for the tag that you removed, the software retrieves the see list values from the database and displays them in the generated spec. To display the values, it is only crucial that the spec form on which you base the new spec contains the columns that appeared in the see list of the tag that you removed. This means that the form of the new spec does not have to be the same as the form of the spec from which you removed the tag, and that the type of the new spec can be either single-tag or multi-tag.

5. On the toolbar, click  to save the changes.

NOTES

- You cannot remove the master tag unless you redefine it as a standard tag.
- The software does not allow you to remove tags that are currently assigned to a Specification Binder package or that were revised in the Document Binder module.

See Also

Change the Master Tag Definition (on page 248)

Multi-Tag Spec Formats (on page 251)

Generate a Spec for an Analyzer Stream

To generate a specification for an analyzer stream, you need a special type of multi-tag specification, which functions as follows:

- You generate a multi-tag specification, with the stream tag as the more master tag.
 - You then add the instrument tags associated with this stream to the multi-tag specification.
 - Fields that relate to the stream are displayed on the common page or pages (not in the see list).
 - The fields that vary — the tag names and tag-specific values — are displayed in the in the see list on the Multi-Tag List tab.
1. Make sure that you have created a multi-tag format based on an analyzer stream form.

TIP The library form #78 is an example of a form designed for an analyzer stream. If this form is not displayed in the **Select Specification Form** dialog box, restore the supplied library forms. You can then create a multi-tag spec format for the form #78.
 2. Based on such a format, generate a multi-tag spec for the stream tag that you want to set as the master tag.
 3. In the **Multi-Tag List** of the generated spec, add other tags belonging to the current analyzer stream.
 4. Click **Actions > Save**.

See Also

Restore Library Forms (on page 228)

Create a Format (on page 252)

Add Instrument Tags to a Multi-Tag Spec in Batch Mode (on page 247)

Generate a Spec for a Complex Analyzer (on page 238)

Multi-Tag Spec Formats

A multi-tag spec format is a template that contains see list columns where you can define instrument-specific values on the **Multi-Tag List** tab of a multi-tag spec. You create a specification format using a specification form as a source, and can build an unlimited number of formats based on a single form.

Create a Format

Use this procedure to create a formats for multi-tag specs. You create a format based on a spec form, which in turn is based on a spec page. You can build an unlimited number of formats based on a given form. When creating a format, you can edit the headers of the columns that appear in the spec see list, and also fine-tune the order and width of columns.

1. On the **Specifications Window** module menu bar, click **Edit > Format Editor**.
2. On the **Format Editor** menu bar, click **Actions > Open Format**.
3. On the **Select Specification Form** dialog box, select a form and click **OK**.
4. On the **Select Format** dialog box, under **Format**, type the name of the new format and click **OK**.

TIP If the form that you selected on the **Select Specification Form** dialog box has existing formats, click **New** before typing the new format name.

5. Do the following for each field that you want to appear on the spec see list:
 - a. In the field selection area of the form (usually on the right), double-click the field.
 - b. To display the original form header in the active row of the **Edit Headers** pop-up window, click the form header after the cursor changes its shape to .
 - c. In the **Edit Headers** pop-up window, edit the header as necessary.
 - d. The background color of the active field changes to magenta.
 - e. Fields already added to the **Edit Headers** pop-up window are highlighted in cyan.
 - f. The  icon in the left column of the **Edit Headers** pop-up window points to the header input box for the active field. If you are working from a library form, the form header was automatically copied to this field.
6. On the **Format Editor** toolbar, click  to generate the format.
7. To change the see list column position of a header and its field, do the following in the **Edit Headers** pop-up window:
 - a. Select the header for which you want to change the column position.
 - b. Click **Move Up** or **Move Down** as necessary.

TIP The order of the headers in the **Edit Headers** pop-up window determines the left-to-right column order on the **Multi-Tag List** tab the spec.
8. To change the width of columns as they appear in the spec see list, do the following on the **Format** dialog box:
 - a. Select portrait or landscape print preview.
 - b. Set the cursor on the border between two headers.
 - c. Drag the border to the left or to the right as necessary.
 - d. Click  to save the new format.

Modify a Format

You can modify an existing format so that it fits the needs of your multi-tag specs. The modification process is similar to creating a new format. Changes that you make to a specification format affect multi-tag specs that are already associated with that format. You modify formats in the **Format Editor**, in the Specifications module.

1. On the **Specifications Window** module menu bar, click **Edit > Format Editor**.
2. On the **Format Editor** module menu bar, click **Actions > Open Format**.
3. On the **Select Specification Form** dialog box, select a form and click **OK**.
4. Select a format that you want to modify, and click **OK**.
5. To edit headers that currently appear in the **Edit Headers** pop-up window, do the following:
 - a. In the field selection area of the form (usually on the right), double-click the field for which you want to edit the header.
 - b. In the **Edit Headers** pop-up window, edit the header as necessary.

TIPS

- When you double click the field, the background color of the field changes to magenta.
 - The  icon in the left column of the **Edit Headers** pop-up window points to the **Header** input box for the active field.
 - To copy the original form header into the active **Header** input box, click the form header after the cursor changes its shape to .
6. To remove a field and its header from the multi-tag list, do the following:
 - a. In the field selection area of the form, double-click the field that you want to delete.
 - b. In the **Edit Headers** pop-up window, click **Remove**.
 - c. To add a field and header to the multi-tag list, do the following:
 - d. In the field selection area of the form, double-click the field that you want to add.
 - e. To display the original form header in the active row of the **Edit Headers** pop-up window, click the form header after the cursor changes its shape to .
 - f. In the **Edit Headers** pop-up window, edit the header as necessary.
 7. To change column position of a header and its field, do the following in the **Edit Headers** pop-up window:
 - a. Select the header for which you want to change the column position.
 - b. Click **Move Up** or **Move Down** as necessary.

TIP The order of the headers in the **Edit Headers** pop-up window determines the left-to-right column order on the **Multi-Tag List** tab the spec.
 8. To change the width of columns as they appear in the spec see list, do the following on the **Format** dialog box:
 - a. Select portrait or landscape print preview.
 - b. Set the cursor on the border between two headers.
 - c. Drag the border to the left or to the right as necessary.
 - d. Click  to regenerate and save the modified format

Delete a Format

This procedure enables you to select a specific form, display its format, and then delete a format that is not in use in multi-tag specs.

1. With the Specifications module window open, do one of the following:
 - On the toolbar, click .
 - On the **Edit** menu, click **Format Editor**.
2. Click **Actions > Delete Formats**.
3. On the **Select Specification Form** dialog box, select a form whose format you want to delete, and then click **OK**.
4. On the **Select Format** dialog box, select the required format from the list.

TIPS

- You can only select and delete one format at a time.
 - The software prevents you from deleting a format that is in use in specs.
5. Click **OK** to delete the selected format.

Regenerate Formats

Use this procedure if you encounter problems with opening or printing a multi-tag spec after upgrading your SmartPlant Instrumentation version. These problems occur because certain format properties are not applied to a form. Format regeneration can fix these problems.

1. In the **Specifications Module** window, click **Actions > Regenerate Formats**.
2. On the **Regenerate Formats** dialog box, click **Run**.
3. On completion of the process, click **Close**.

Change the Format for a Multi-Tag Spec

You use this procedure if more than one format exists for a form.

1. Open a multi-tag spec.
2. Click **Actions > Change Format**.
3. On the **Select Format** dialog box, select the required format from the list.

TIP

After changing the format, the software only shows see list columns that appear in the format that you selected. As a result, if the current see list columns do not appear in the selected format, the software retains the column values in the database but does not display them in the spec after you change the format.

4. Click **OK** to change the format.

Define Multi-Tag Spec Print Layout

You use this procedure to define a custom print layout for a specific format. This feature is useful if the default print layout causes data display problems in the printout.

1. In the Specifications module, click **Edit > Format Editor**.
 2. On the **Format Editor** menu bar, click **Actions > Open Format**.
 3. Select the target spec form and click **OK**.
 4. Select the target format or create a new one and click **OK**.
 5. On the form that opens, add field headers to the **Edit Headers** dialog box. For details, see *Create a Format* (on page 252).
 6. On the toolbar, click  to save the format.
 7. On the menu bar, click **Actions > Define Print Layout**.
 8. From the **Column Header** pop-up window, drag the field headers to the **Define Print Layout** dialog box.
- TIP** The number of the columns on the **Define Print Layout** dialog box corresponds to the number of the headers in **Column Header** pop-up window. You can drag up to five headers under the same column on the **Define Print Layout** dialog box.
9. Click **Generate**.
 10. On the **Generate Print Layout** dialog box, select the appropriate printout orientation and click **OK**.
 11. Test the defined print layout as follows:
 12. Click **File > Preferences > Specifications > Multi-Tag Specifications** and clear the **Use default print layout** check box.
 13. Open a multi-tag spec assigned to the format for which you defined the print layout.
 14. Print the spec.

NOTES

- You can define a printout size for a multi-tag specification. For details, see *Define a Printout Size for a Multi-Tag List* (on page 255).
- If you want modify the print layout, for example by adding more column headers, you must regenerate the print layout and then save it.
- The defined print layout applies to all existing and new multi-tag specs assigned to the form that uses the current format.

Define a Printout Size for a Multi-Tag List

This option allows you to define a printout size for the multi-tag list in a multi-item specification.

1. In the Specifications module, click **Edit > Format Editor**.
2. Do one of the following:
 - On the menu bar, click **Actions > Open Format**
 - On the lower toolbar, click .
3. On the **Select Specification Form** dialog box, select a form with available multiple tags.
4. Click **OK** to open the **Select Format** dialog box.
5. Select an appropriate format and click **OK**.
6. In the **Format Editor**, click **Actions > Define Multi-Item List Printout size**.

7. Select an appropriate printout size and click **OK**.
8. In the **Format Editor**, save the format.

NOTE The printout size definition is valid for a specific format that has a multi-item list.

SECTION 23

Non-Instrument Specifications

A non-instrument specification is a specification whose item type is not Instrument. A spec page associated with a non-instrument spec form contains various properties of the source item. If needed, you can regenerate the spec page and add more columns from the tables <item type>, udf_<item type>, spec_sheet_data, and add_spec1..9. For example, in a cable specification, you can add columns from the tables CABLE, UDF_CABLE, and so forth. SmartPlant Instrumentation allows you to generate the non-instrument specifications for the following item types:

- Cable — Allows you to create a specification for a single reference cable defined in the **Reference Explorer**.
- Panel — Allows you to create a specification for a single reference panel in the **Reference Explorer**.
- Wiring Equipment — Allows you to create a specification for a single reference wiring equipment item. A wiring equipment item can be an I/O card, I/O termination, fieldbus brick, or any other user-defined wiring equipment in the **Reference Explorer**.
- Hook-Up Item — Allows you to create a specification for a single hook-up item defined in the **Reference Explorer**.
- Loop — Allows you to create a single-section loop specification. This specification consists of the main page with the loop number data and the note page, which is created automatically and refers to the loop number only. The form associated with the loop number page is the form that you defined for the Loop item type.

NOTE If you need to create a specification for a loop and its tags, we recommend that you create a loop composite spec with multiple sections. For details, see *Loop Composite Spec: Generation Workflow* (on page 262).

SmartPlant Instrumentation does not support saving non-instrument specifications as .isf files. Therefore, you cannot use the export or import options to work with these specifications in External Editor. Saving non-instrument specifications in Excel format is not supported either.

Prerequisites for Generating a Non-Instrument Spec

This topic lists the prerequisites for generating a non-instrument spec.

General Prerequisites

In the **Form Editor**, you must restore a form for the item type you want to assign with the specification. For example, to generate a specification for a specific cable, you must first restore the library form 80.

Cable Spec Generation Prerequisite

In the **Reference Explorer**, create a reference cable.

Panel Spec Generation Prerequisite

In the **Reference Explorer**, create a reference panel.

Wiring Equipment Generation Prerequisite

In the **Reference Explorer**, create an I/O card, I/O termination, fieldbus brick, or any other user-defined wiring equipment.

Hook-Up Item Spec Generation Prerequisite

In the **Reference Explorer**, create a hook-up item and assign it to an item library.

Generate a Non-Instrument Spec

Use this procedure to create a specification for a hook-up item, reference cable, reference panel, or reference wiring equipment. In this procedure, cable spec generation steps are shown as an example. Procedures of creating other non-instrument specifications follow the same pattern.

NOTE Before you perform this procedure, restore the appropriate library forms.

1. In the Specifications module, click **Actions > Open Specification**.
2. On the **Open Specification** dialog box, from the **Item type** list, select **Cable**.
3. Enter a name of a reference cable, or click **Find** to find the required reference cable or form.
4. After specifying the cable name and the form number, on the **Open Specification** dialog box, click **OK**.
5. On the **New Specification** dialog box, accept or modify the document number associated with the new specification.

TIPS

- The software automatically creates the document number using the cable name as a source, and append the -SP suffix. There is no naming convention for a non-instrument spec document number.
 - You can leave the **Document number** box empty if you want to specify the document number manually, after opening the specification. In the specification, you can enter the document number in the title block.
 - You can only create a single-cable specification. The software does not support a see list for non-instrument specs.
6. Click **OK** to generate a specification.

TIPS

- If you want to save the cable specification as a .psr file, click **Actions > Save As**, and select **Original**.
- You can edit various cable properties in the cable spec in two ways: in the cable spec itself, or on the **Properties** dialog box, which you can open for the cable in the **Reference Explorer**.

See Also

Restore Library Forms (on page 228)

Principles of Generating Specifications (on page 195)

SECTION 24

Composite Specifications

A composite specification is a specification that contains more than one section. You can either define loop composite specs or instrument composite specs. A loop composite spec includes a loop and its instrument tags. A composite instrument spec can include tags belonging to the same or different loops. In contrast to multi-tag instrument specifications, which contain pages of common properties in addition to the SEE LIST page, such composite specs do not have common pages and can include tags whose process functions are not identical. Each section in a composite spec page contains data pertinent to a specific instrument tag. Also, it is possible to create a composite spec that includes process data cases of a particular instrument. Unlike other specs you create in SmartPlant Instrumentation, a composite spec does not have a **Notes** page. If you want to use notes, you must manually add a note box in the appropriate section.

In the **Domain Explorer**, document numbers of loop composite specs appear under loop numbers and document numbers of instrument composite specs appear under each instrument included in the spec. When duplicating an instrument tag associated with a composite spec, the software never duplicates the composite spec. When duplicating a loop, the software always duplicates the loop composite spec.

Generating and Printing Composite Specs

When generating a composite spec, if you assigned more than one instrument to a particular section, the software multiplies this section on the spec as many times as the number of assigned instruments. You can set the software to multiply sections from left to right or from top to bottom. When more than one instrument is assigned to the same section, the instruments are sorted automatically in ascending order according to tag number. In a composite spec that contains process data cases of an instrument, the cases are sorted in ascending order according to case sequence defined in the Process Data module (governing case is always the left-most section).

When printing a composite specification, we recommend that the print sheet size be either A4 or Letter. Note, however, that if the title block assignment method in the current domain is defined as **Standard (used in all modules)**, you need to adjust your title block before printing specs using the Letter size. For details, see *Spec Title Blocks* (on page 265).

Managing Composite Spec Sections

SmartPlant Instrumentation comes shipped with several spec forms that already include composite pages with predefined sections (for example, forms 88, 89, 90). You must restore these forms before you start working with the sections included in the composite pages of these forms. A form with a composite page cannot include any other pages. In SmartPlant Instrumentation, you can create new sections on the basis of existing ones but it is not possible to create a section from scratch.

You manage spec sections in the **Sections Editor**. Spec section editing options are the same as for spec pages, which you manage in the **Page Editor**. Therefore, before modifying data fields in a spec section, it is recommended that you familiarize yourself with spec page management options. For details, see *Specification Pages* (on page 203) and the related topics. The **Section Editor** has a limited number of editing options. It is possible, however, to export spec sections to InfoMaker, edit them as you require, and then import them back to SmartPlant Instrumentation.

Features not Supported for Composite Specs

The following features of SmartPlant Instrumentation are not supported for composite specs:

Exporting data to External Editor (IEE)

- Save as Excel options
- Claim or merge options (only relevant in an owner operator domain)
- Copying data from a form data template or another spec
- Multi-tag list format options or inclusion of composite pages in a multi-tag spec
- **Spec Data Dictionary** options
- Browser options
- Data comparison and history options
- Changing the section process function
- Custom title block assignment options available in the Specifications module (you must use the **Standard** custom title block assignment method if you want to display a custom title block in composites specs)
- Using InfoMaker with composite specs saved as .psr files.

Composite Spec for Multiple Instruments: Generation Workflow

In this scenario, you create an instrument composite spec containing two sections: one for a control valve and the other for an I/P transducer. Such a spec can include multiple control valves and I/P transducers belonging to different loops. You use the library form **Control Valve/I/P Transducer** as a source for creating a new form and assigning a new composite spec page to this form.

1. In the Instrument Index module, or using the **Domain Explorer**, create a control valve and I/P transducer.
2. On the **Specifications Module** window menu bar, click **Edit > Form Editor**.
3. On the **Form Editor** menu bar, click **Actions > Restore Form** and then restore form **Control Valve/I/P Transducer** (form number 90).

TIP When restoring the form, the software restores its page and enables you to work with sections that this page includes.

4. On the **Specifications Module** window menu bar, click **Edit > Section Editor** and modify the fields of the following sections as you require:
 - **Control Valve Style3** (item type **Instrument**)
 - **I/P Transducer Style3** (item type **Instrument**)
5. On the **Specifications Module** window menu bar, click **Edit > Page Editor**.
6. On the **Page Editor** menu bar, click **Actions > New Composite Page**.
7. On the **New Composite Page** dialog box, select **Data sections with headers**.
8. On the **Select Sections for Composite Page** dialog box, under **Multiply sections in generated spec**, select **From top to bottom**, and then select the following sections:
 - **Control Valve Style3**
 - **I/P Transducer Style3**

TIP When you select a section multiplying option, you determine how the software multiplies sections in a generated composite spec. In a generated spec, if you assigned more than one instrument to a section, the software multiplies this section on the spec as many times as the number of assigned instruments. You set a section multiplying option only once and cannot change it after you open and save the current spec page in the **Page Editor**. This setting applies to all the sections you add in the current spec page.

9. In the **Page Editor** working area, position the sections one under the other, within the page borders.
10. Save the page with the name **CV/I/P Transducer Test**.
11. Open the **Form Editor** and click **Actions > New Form**, select the **Control Valve/I/P Transducer** page for the form, and then name the new form as **CV/I/P Transducer Test** and specify a form number.
12. On the **Specifications Module** window menu bar, click **Actions > Open Specification** and do the following:
 - a. From the **Item type** list, select **Instrument**.
 - b. In the **Item number** box, enter the tag number of the control valve you created.
 - c. In the **Form number** box, enter the number of the **CV/I/P Transducer Test** form and click **OK**.
 - d. On the **New Composite Specification** dialog box, beside **I/P Transducer Style1**, click **Assign** and assign your I/P transducer to the **I/P Transducer Style1** section.
 - e. Click **OK** to generate and open an instrument composite specification.

See Also

Principles of Generating Specifications (on page 195)

Composite Spec for Instrument with Cases: Generation Workflow

In this scenario, you create an instrument composite spec containing three process data cases of an instrument with the Flow process function. You use the library form **Orifice Plate Composite** as a source for creating a new form and assigning a new composite spec page to this form.

1. In the **Instrument Index** module, or using the **Domain Explorer**, create a flow instrument.
2. In the **Process Data** module, create three cases for the instrument and define process data for each case.
3. On the **Specifications Module** window menu bar, click **Edit > Form Editor**.
4. On the **Form Editor** menu bar, click **Actions > Restore Form** and then restore form **Orifice Plate Composite** (form number 88).

TIP When restoring the form, the software restores its page and enables you to work with sections that this page includes.
5. On the **Specifications Module** window menu bar, click **Edit > Section Editor** and modify the fields of the following sections as you require:
 - **Flow Orifice Header** (header section)
 - **Flow Orifice Data** (data section)
6. On the **Specifications Module** window menu bar, click **Edit > Page Editor**.
7. On the **Page Editor** menu bar, click **Actions > New Composite Page**.
8. On the **New Composite Page** dialog box, select **Header section and data section**.
9. On the **Select Sections for Composite Page** dialog box, select the following sections:
 - **Flow Orifice Header**
 - **Flow Orifice Data**
10. In the **Page Editor** working area, position the sections one under the other.
11. Save the page with the name **Orifice Plate Composite Test**.

12. Open the **Form Editor** and click **Actions > New Form**, select the **Orifice Plate Composite** page for the form, and then name the new form as **Orifice Plate Composite Test** and specify a form number.
13. On the **Specifications Module** window menu bar, click **Actions > Open Specification** and do the following:
 - a. From the **Item type** list, select **Instrument**.
 - b. In the **Item number** box, enter the tag number of the flow instrument that has cases.
 - c. In the **Form number** box, enter the number of the **Orifice Plate Composite Test** form and click **OK**.
 - d. Select a case to assign it to the instrument composite spec you are creating and click **OK**.
 - e. On the **New Composite Specification** dialog box, beside **Flow Orifice Data**, click **Assign** and assign the two remaining cases to the **Flow Orifice Data** section.
 - f. Click **OK** to generate and open an instrument composite specification.

TIP In the composite spec, the sections that show case data appear from left to right. The sections are sorted in ascending order according to case sequence defined in the Process Data module (governing case is always the left-most section).

See Also

Principles of Generating Specifications (on page 195)

Loop Composite Spec: Generation Workflow

In this scenario, you create a loop composite spec containing three sections: a loop section and two instrument sections. The two instrument sections include one for a control valve and the other for an I/P transducer. You use the library form **Flow Loop Composite Style1** as a source for creating a new form and assigning a new composite spec page to this form.

1. In the Instrument Index module, or using the **Domain Explorer**, create a loop with a control valve and I/P transducer.
2. On the **Specifications Module** window menu bar, click **Edit > Form Editor**.
3. On the **Form Editor** menu bar, click **Actions > Restore Form** and then restore form **Flow Loop Composite Style1** (form number 91).

TIP When restoring the form, the software restores its page and the seven sections that this page includes. In this scenario, you need three of these sections to generate the current composite loop spec.
4. On the **Specifications Module** window menu bar, click **Edit > Section Editor** and modify the fields of the following sections as you require:
 - **Flow Loop Composite Style1** (item type **Loop**)
 - **Control Valve Style1** (item type **Instrument**)
 - **I/P Transducer Style1** (item type **Instrument**)
5. On the **Specifications Module** window menu bar, click **Edit > Page Editor**.
6. On the **Page Editor** menu bar, click **Actions > New Composite Page**.
7. On the **New Composite Page** dialog box, select **Loop composite page**.
8. On the **Select Sections for Composite Page** dialog box, under **Multiply sections in generated spec**, select **From top to bottom**, and then select the following sections:
 - **Flow Loop Composite Style1**
 - **Control Valve Style1**
 - **I/P Transducer Style1**

TIP When you select a section multiplying option, you determine how the software multiplies sections in a generated composite spec. In a generated spec, if you assigned more than one instrument to a section, the software multiplies this section on the spec as many times as the number of assigned instruments. You set a section multiplying option only once and cannot change it after you open and save the current spec page in the **Page Editor**. This setting applies to all instrument sections you add in the current spec page.

9. In the **Page Editor** working area, position the sections one under the other, with the loop section placed at the top.
10. Save the page with the name **Flow Loop Test**.
11. Open the **Form Editor** and click **Actions > New Form**, select the **Flow Loop Test** page for the form, and then name the new form as **Flow Loop Test** and specify a form number.
12. On the **Specifications Module** window menu bar, click **Actions > Open Specification** and do the following:
 - a. From the **Item type** list, select **Loop**.
 - b. In the **Item number** box, enter the number of the loop you created.
 - c. In the **Form number** box, enter the number of the **Flow Loop Test** form and click **OK**.
 - d. On the **New Composite Specification** dialog box, beside **Control Valve Style1**, click **Assign** and assign the current loop control valve to the **Control Valve Style1** section.
 - e. Beside **I/P Transducer Style1**, click **Assign** and assign the current loop I/P transducer to the **I/P Transducer Style1** section.
 - f. Click **OK** to generate and open a loop composite specification.

See Also

Principles of Generating Specifications (on page 195)

Remove an Instrument from a Composite Spec

1. In a composite specification, do one of the following:
 - On the **Actions** menu, click **Remove Tags from Composite Spec**.
 - On the toolbar, click 
2. In the dialog box that opens, select one or more tags and click **OK**.
3. On the toolbar, click  to refresh the spec.

TIPS

- When removing tags from a loop composite spec, you can remove all the instruments.
 - When removing tags from an instrument composite spec, you cannot remove the last remaining tag because such a spec must include at least one instrument tag.
 - After removing instruments, the sections remain displayed in the spec. If you want to remove these sections from the spec, you must remove them in the **Page Editor**. For details, see *Remove a Section from a Composite Page* (on page 264).
4. On the toolbar, click  to save the changes.

Remove a Section from a Composite Page

1. Open a composite spec in the **Page Editor**.
2. In the working area, select and right-click a section you want to remove from the current page.
3. On the shortcut menu, click **Remove Current Section**.

TIP If a composite spec including the selected section already exists, the software does not allow you to remove the section. You must first open such a spec and dissociate all the instruments that are assigned to the current section.

Edit a Section in a Composite Spec

Use this procedure to customize a section in SmartPlant Instrumentation. You can save any page to the database, whether this is a section you open from an external file, or a library section you modified.

1. To save the section as a .psr file, do the following:
 - a. Open the desired section in the **Section Editor**.
 - b. Do one of the following:
 - Click **Actions > Save as File**.
 - On the **Section Editor** toolbar, click .
 - c. On the **Save As** dialog box, navigate to the required folder and type the target file name.
 - d. Click **OK** to save the file.

2. Edit the page in InfoMaker - see *PSR File Customization Using InfoMaker* (on page 612).

NOTE Changing section coordinates (dimensions) may affect the appearance of the section in composite specs where it is used.

3. To overwrite the section in SmartPlant Instrumentation, do the following:
 - a. Open a spec section in the **Section Editor**.
 - b. Click **Actions > Save as Page**.
 - c. On the **Save as Section** dialog box, do one of the following:
 - To create a new section, click **New**. On the dialog box that opens, type a unique name and an optional description, and then click **OK**.
 - To overwrite an existing section, highlight the section you wish to replace on the **Section** column and then click **OK**. When asked to confirm overwriting the existing section, click **Yes**.

NOTES

- If the section you are overwriting is used in an existing composite spec, you will receive a warning regarding the possible effect of this on existing composite specs and asked to re-confirm overwriting the section.
- If you modified section coordinates, verify that the modified section appears as it should in composite spec(s).

SECTION 25

Spec Title Blocks

A specification title block is a shipped or custom .psr file that combines revision rows, database fields, and a logo. You assign a title block to a spec form to display the relevant information in specifications based on that form. If a form contains several pages, the title block is common to every page of the form. In a generated single-section spec, the software displays the same title block on every spec page, including the **Notes** page. In a generated composite (multi- section) spec, the software does not display the title block; you need to open a spec print preview to display the title block.

The System Administrator, when making or modifying domain definitions in the Administration module, can select a custom title block assignment method. The following title block assignment methods are available:

Standard (used in all modules)

This method allows you to associate one default title block with all the specs you generate. When using this method, the software hides all the title block assignment options that are available in the Specifications module. In this case, you need to associate your title block with SmartPlant Instrumentation on the **Title Blocks** dialog box. The Domain Administrator, when managing reports, can then define your title block as the default title block that appears automatically in all specifications that you generate.

NOTES

- If you print specs using the A4 sheet size, we recommend that you use the **Specs Default TB with PB Units.psr** title block with specs, which is fully compatible with all the library forms and does not require any manual adjustments. This is a template title block that is shipped with SmartPlant Instrumentation. This title block is created using PowerBuilder units.
- If you print specs using the Letter sheet size, you must first customize the **Specs Default TB with PB Units.psr** title block in InfoMaker by reducing the title block height. Removing two revision rows from the title block is enough to make it appear correctly in a printout of any spec based on a library form.
- If you want to use a custom title block, you need to place the title block correctly in a spec page layout. To do so, on the **Preferences** dialog box, **Specifications > Custom** page, under **Parameter**, enter **TitleFooterHeight**, and under **Value**, enter **798**, which is the optimal value for specifications created using SmartPlant Instrumentation options. For a spec page created in InfoMaker, you may need to enter a different value, depending on the page layout settings.

Special (used in the Specifications module only)

This method allows you to assign various title blocks to spec forms. If this method is defined in the current domain, the Domain Administrator does not assign any default title block to your specs, so you need to make title block assignments by yourself, using the Specifications module options. You can create multiple custom title blocks and associate them with SmartPlant Instrumentation using the **Title Block Styles** dialog box. Depending on your database platform, you must only use one of the following title blocks as a source for creating custom title blocks: **tb_mss.psr** (when using SQL Server), **tb_ora.psr** (when using Oracle, or **Tbsample.psr** (when using Sybase Adaptive Server Anywhere).

NOTE When working with composite specs, you cannot use the title block assignment options that are available in the Specifications module. Therefore, if the selected block assignment method is **Special**, the software automatically assigns the default title block to a composite spec even though the module- specific option are available in the Specifications module. This title block is supplied with SmartPlant Instrumentation and is associated by default with all SmartPlant Instrumentation reports.

Title Block in a Multi-Tag Spec

A multi-tag specification does not require any special procedure for associating a title block. The software associates a title block with a multi-tag page through the spec form that it belongs to. That is, when a multi-tag spec form has an associated title block, this title block appears automatically on all pages of the spec. When you open a multi-tag spec, the **Multi-Tag List** (see list) page appears without a title block. However, if you open a print preview or print the specification, the software displays the same title block on all of the spec pages.

Spec Title Block Common Tasks

The following tasks deal with customizing, assigning, and modifying spec title blocks if the System Administrator, when making the current domain definitions, defined the custom title block assignment method as **Special**. If the method is defined as **Standard**, you only need to associate a title block with SmartPlant Instrumentation using the **Title Blocks** dialog box options. Then, your Domain Administrator can define this title block as the title block that appears in any spec you generate, regardless of the spec form or spec type.

Customize a Title Block in InfoMaker

This procedure allows you to customize a title block using Sybase InfoMaker. After performing this procedure, you can insert the customized report layout into SmartPlant Instrumentation so that it becomes a custom title block. For more information, see *Customize a Title Block in InfoMaker* (on page 267).

Assign a Title Block to a Form

Use this procedure to assign a title block that you created or edited in InfoMaker to a spec form. You then set the block position and size within the form. For more information, see *Assign a Title Block to a Form* (on page 268).

Modify a Custom Title Block

Use this procedure to modify a custom title block that you have already imported into SmartPlant Instrumentation from a .psr file. The software automatically updates the title block in all spec forms that use this title block. For more information, see *Modify a Custom Title Block* (on page 268).

Update Custom Title Blocks After Version Upgrade

After upgrading SmartPlant Instrumentation, you must manually update all of your custom title blocks based on the title block files Tb_ora.psr, Tb_mss.psr, Tbsample.psr. Then, you need to reassign the title blocks to your spec forms. For more information, see *Update Custom Title Blocks After Version Upgrade* (on page 269).

Customize a Title Block in InfoMaker

NOTE If, in SmartPlant Instrumentation, a Standard title block assignment method is defined, and you use the A4 sheet size to print specifications, you do not have to perform this procedure. Instead, you can use the title block **Specs Default TB with PB Units.psr** file, that is supplied with SmartPlant Instrumentation. However, if you want to print specs using the Letter size, you still need to make some adjustments even to the **Specs Default TB with PB Units.psr** title block.

1. Start InfoMaker and a .psr file created on the basis of one of the following files: **Tb_ora.psr** (for use on Oracle), **Tb_mss.psr** (for use on SQL Server), or **Tbsample.psr** (for use in Sybase Adaptive Server Anywhere)
2. When adding other design- related items, such as internal lines, text boxes, and so forth, to the title block, add the **tb** segment to the names of the new items. For example, if you want to add a new line, name the line as **<Line>_tb_<1>**. This is required to distinguish between items that belong to the title block and items that belong to the rest of the report outside the title block.
3. Modify the report layout using the following guidelines:
 - When you edit the logo field, do not change the value logo under **Name**, on the **General** tab of the **Properties** dialog box. This is crucial if you intend to use Save as Excel options of SmartPlant Instrumentation to save specifications based on a form that incorporates this title block.
 - All the objects in the report layout, such as lines, text, field, and so forth must be defined as the Background Layer. If you are creating a new object, make sure you change it from the default band layer to the Background Layer.
 - Objects that appear in the report layout one below another, such as revision rows, must be defined as Detail Band Layer.
 - If you add revision rows, make sure you decrease the row height so that the title block height is not greater than the default height of the title block you customize. A custom title block whose height is greater than the default height causes display problems on the **Note** page of a SmartPlant Instrumentation specification.
 - Do not make any changes to SQL statements.
 - Do not include left or right borders since the border of the page will be used for the title block.
 - If you move any report layout items while working on the report layout, make sure you reposition those items exactly in their original locations.

TIPS

- You cannot insert a new field in the report layout. You can only modify existing fields.
 - If you want to use the **Specs Default TB with PB Units.psr** in your specs and print specs using the Letter size, we recommend that you remove two revision rows from this title block in InfoMaker to adjust the title block height for the Letter size.
 - The width of the title block should not be greater than 7.5" in portrait layout or 9.8" in landscape layout. If the title block width is greater than specified, an extra blank sheet is added to your drawing.
4. Save the report layout under a different name and close InfoMaker.

Assign a Title Block to a Form

1. On the **Specifications Module** window menu bar, click **Actions > Title Block Styles**.
2. On the **Title Block Styles** dialog box, click **New**.
3. On the **Title Block Definition** dialog box, select the appropriate .psr file, and click **OK**.
TIP You must select a file created on the basis of one of the following files: Tb_ora.psr (for use on Oracle), Tb_mss.psr (for use on SQL Server), or Tbsample.psr (for use in Sybase Adaptive Server Anywhere).
4. Under **Style name**, type the new title block name.
5. Under **Number of revisions**, accept the displayed number of revision lines.
6. Set the new title block size by using the four-directional arrows.
TIPS
 - The red line outlines the title block border.
 - Under **Units per click**, type a numeric value to set how far the jump will take the red line when clicking one of the four-directional arrows.
7. Click **OK**, and on the **Title Block Styles** dialog box, click **Close**.
8. Set the location of the title block in the specification as follows:
 - a. On the **Specifications Module** window menu bar, click **Actions > Associate Title Block**.
 - b. On the **Select Specification Form** dialog box, select a form, and click **OK**.
 - c. On the **Associate Title Block** dialog box, under **Style Name**, select the title block that you imported.
 - d. Under **Choose location**, select **Detail**.
 - e. Drag the title block to the required location in the specification page and when done, click **OK**.

Modify a Custom Title Block

1. On the **Specifications Module** window menu bar, click **Actions > Title Block Styles**.
2. On the **Title Block Styles** dialog box, select the title block that you want to edit, and click **Properties** to open the **Title Block Definition** dialog box.
TIP If you have made any changes to the title block in InfoMaker, click **Open File**, and then, select the title block .psr file and click **OK**.
3. Under **Style name**, type the new title block name if needed.
4. Under **Number of revisions**, set the number of revision lines to be displayed in the title block according to the revision lines that the title block contains.
TIP If the number of revisions that you set is greater than the number of the revision rows, you might have display problems in the title block.
5. Set the new title block size by using the four-directional arrows.
TIPS
 - The red line outlines the title block border.
 - Under **Units per click**, type a numeric value to set how far the jump will take the red line when clicking one of the four-directional arrows.
6. Click **OK**, and on the **Title Block Styles** dialog box, click **Close**.

Update Custom Title Blocks After Version Upgrade

1. On the **Specifications Module** window menu bar, click **Actions > Title Block Styles**.
2. On the **Title Block Styles** dialog box, select a title block based on Tb_ora.psr, Tb_mss.psr, or Tbsample.psr file, and click **Properties**.
3. On the **Title Block Definition** dialog box, click **Export File**, and then, save this file as a .psr file, for example, Update.psr.
4. Close SmartPlant instrumentation, and then, in InfoMaker, open the source .psr file, on which the Update.psr is based. For example, if the source title block file is Tbsample.psr, you must open this file in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).
5. Redraw the title block in InfoMaker according to the Update.psr title block requirements.
6. Save this file as Update.psr to overwrite the current Update.psr file.
7. Reopen SmartPlant instrumentation, and then, on the **Specifications Module** window menu bar, click **Actions > Title Block Styles**.
8. On the **Title Block Styles** dialog box, select a title block, and click **Properties**.
9. On the **Title Block Definition** dialog box, click **Open File**, and then, select the Update.psr file and click **OK**.
10. On the **Title Block Definition** dialog box, click **OK**, to update the title block definition in the database and re-assign the updated title block to all the spec forms that use it.
11. On the **Title Block Styles** dialog box, click **Close**.

SECTION 26

Copying Specification Data

The automated data copying options are useful when you need to create a number of specifications with similar data. You can use the following sources for copying specification data:

- **Form data template** — You can copy data to any spec whose form is the same as the template form.
- **Specification** — You can copy data either to another spec or to a form data template, provided that the source and target form is the same. When you copy data to a form data template, the software does not affect data of existing specs that are based on this template.

Data copying options are only available in the Specifications module. You cannot copy specification data in batch mode.

You can protect all or certain fields from being overwritten when you copy specification data. You can protect the appropriate fields in the **Spec Data Dictionary**. Also, you can set preferences for copying specification data. The following options are available on the **Preferences** dialog box (**File > Preferences > Specifications > General**):

- **Copy without overwriting existing data** — Copies data to empty fields only. This option does not overwrite data that already exists in the target form data template or spec.
- **Copy excluding blank fields in source** — Copies data from source fields except for those source fields that have no data.
- **Copy all fields** — Overwrites all data fields in the target form data template or spec.

Copying Specification Data Common Tasks

The following tasks enable you to copy spec data from one spec to another, or to use form data templates.

Protect Fields from Overwriting When Copying Data

Use this procedure to protect fields from overwriting of data when you copy specification data or import data from an external spec to a spec that exists in SmartPlant Instrumentation. You perform this procedure at the form level. The fields that you protect for a given form apply to all new form data templates you create for this form. For more information, see *Protect Fields from Overwriting When Copying Data* (see "Protect Fields from Being Overwritten When Copying Data" on page 272).

Copy Data from One Spec to Another

Use this procedure to copy data from one spec to another. You can copy data from a spec belonging to any plant group of the current <plant>. The source and target spec form number must be the same. For more information, see *Copy Data from One Spec to Another* (on page 274).

Copy Data to a Spec from a Form Data Template

Use this procedure to automate entry of common data to your specification by using a form data template that you created for the form upon which the current spec is based. For more information, see *Copy Data to a Spec from a Form Data Template* (on page 273).

Copy Data to a Form Data Template from a Spec

Use this procedure to copy a batch of data to a form data template from a specification. This can be an efficient way of building the template, which you can then use to transfer common data to other specs based on the same form. When you copy data to a form data template, the software does not affect data of existing specs that are based on this template. For more information, see *Copy Data to a Form Data Template from a Spec* (on page 272).

Protect Fields from Being Overwritten When Copying Data

1. On the Specifications Module window toolbar, click  to open the **Spec Data Dictionary**.
2. On the **Select Specification Form** dialog box, select a form, and click **OK**.
3. On the toolbar, click  (**Properties**).
4. To protect the fields in the correct form, do one of the following:
 - To protect all of the fields from one or more tables, click the **Tables** tab, and then, under **Template Fields**, click **All** for the appropriate tables.
 - To protect individual fields, on the **Field Properties** tab, in the **Template** column, select the appropriate check boxes.
5. On the toolbar, click  to save the changes.

See Also

Create and Modify a Form Data Template (on page 232)

Copy Data to a Form Data Template from a Spec

1. Click **File > Preferences > Specifications > General**.
 2. Under **Data copying options**, select one of the following:
 - **Copy without overwriting existing data** — Copies data to empty fields only. This option does not overwrite data that already exists in the target form data template.
 - **Copy excluding blank fields in source** — Copies data from source spec fields except for those source spec fields that have no data. This means that if a certain field in the source spec does not have any value or only has spaces, the software ignores this field when copying data.
 - **Copy all fields** — Overwrites all data fields in the form data template. A source field that only has spaces is considered blank.
- TIP** The Domain Administrator can restrict the ability of other users to set their preferences. Therefore, you can find that the data copying options are disabled. If you want to enable these options, contact your Domain Administrator, who can manage preferences from the Administration module.
3. On the **Specifications Module** window menu bar, module, click **Edit > Form Data Template Editor**.
 4. On the **Select Specification Form** dialog box, select a form that has a data template, and click **OK**.
 5. On the **Select Form Data Template** dialog box, select a form data template from the list.
 6. Click **OK** to open the form data template.

TIP If the form data template has fields that are not accessible, these fields are protected in the **Spec Data Dictionary**. When copying data, the software ignores protected fields. For details, see *Protect Fields from Overwriting When Copying Data* (see "Protect Fields from Being Overwritten When Copying Data" on page 272).

7. On the menu bar, click **Actions > Copy From**.
8. On the **Find Item** dialog box, under **Form number**, select the form of the spec you want to use for copying data, and click **Find**.
9. Under **Search results**, select the item whose spec you want to use as a source for copying data.
10. Click **OK** to copy the spec data.
11. On the toolbar, click  to save the changes.

See Also

Create and Modify a Form Data Template (on page 232)

Copy Data to a Spec from a Form Data Template

1. Click **File > Preferences > Specifications > General**.
2. Under **Data copying options**, select one of the following:
 - **Copy without overwriting existing data** — Copies data to empty fields only. This option does not overwrite data that already exists in the target spec.
 - **Copy excluding blank fields in source** — Copies data from template fields except for those template fields that have no data. This means that if a certain field in the form data template fields does not have any value or only has spaces, the software ignores this field when copying data.
 - **Copy all fields** — Overwrites all data fields in the spec. A source field that only has spaces is considered blank.

TIP The Domain Administrator can restrict the ability of other users to set their preferences. Therefore, you can find that the data copying options are disabled. If you want to enable these options, contact your Domain Administrator, who can manage preferences from the Administration module.

3. In the Specifications module, open the spec to which you want to copy data.
4. On the menu bar, click **Actions > Copy from Template**.
5. On the **Select Form Data Template** dialog box, select a form data template from the list.
6. Click **OK** to copy the data from the selected form data template to the specification.
7. Save the specification.

See Also

Create and Modify a Form Data Template (on page 232)

Copy Data from One Spec to Another

1. Click **File > Preferences > Specifications > General**.
2. Under **Data copying options**, select one of the following:
 - **Copy without overwriting existing data** — Copies data to empty fields only. This option does not overwrite data that already exists in the target spec.
 - **Copy excluding blank fields in source** — Copies data from source spec fields except for those source spec fields that have no data. This means that if a certain field in the source spec does not have any value or only has spaces, the software ignores this field when copying data.
 - **Copy all fields** — Overwrites all data fields in the target spec. A source field that only has spaces is considered blank.
- TIP** The Domain Administrator can restrict the ability of other users to set their preferences. Therefore, you can find that the data copying options are disabled. If you want to enable these options, contact your Domain Administrator, who can manage preferences from the Administration module.
3. In the Specifications module, open the spec to which you want to copy data.
4. On the menu bar, click **Actions > Copy from Specification**.
5. On the **Find Item** the dialog, under **Form number**, select the form upon which your specification is based, and click **Find**.
6. Under **Search results**, select the item whose specification you want to use as a source for copying data.

TIP When you copy data to a spec, be careful when overwriting existing data. In the **Spec Data Dictionary**, you can define fields that you do not want to overwrite. For more details, see *Protect Fields from Overwriting When Copying Data* (see "Protect Fields from Being Overwritten When Copying Data" on page 272).
7. Click **OK** to copy the data.
8. Save the specification.

SECTION 27

Spec Revisions and Data Comparison

You use revisions to keep track of changes in your specifications. If the Domain Administrator has set the software to archive revisions, you can view, print, and compare previous revisions of specifications with the current versions.

You can manage spec revisions in the following ways:

- **Locally** — managing revisions that belong to a currently open spec. When managing revisions locally, you open a particular spec and then open the **Revisions** dialog box, where you can add, edit, or delete current spec revisions. In this dialog box, when you first select a revision numbering method, several options are available to you, including preliminary revisions (designated by P0, P1, P2...). After you select one of the other revision methods, you can no longer return to the preliminary revision method and this option becomes disabled. When using SmartPlant Foundation revisions, the revision numbering methods are not available for selection. Only the last five revisions appear in the **Revisions** dialog box or in the spec title block.
- **Globally** — managing revisions that belong to any number of existing specs. You do not need to open the Specifications module to manage revisions globally, only the **Global Revisions** dialog box. Also, if you want to view all revisions belonging to all existing specs, in the Specifications module, you need to click **Actions > Manage Spec Revisions**. If you want to print out revisions belonging to various specs, you can click **Actions > Spec Revisions**.

In the Specifications module, you cannot revise instrument specifications that you assigned to a Specification Binder package in the Document Binder module. Therefore, the software prevents you from adding new revisions to these specs, or delete these spec revisions.

Revision and Data Comparison Common Tasks

The following tasks deal with managing spec revisions and comparing spec data.

Manage Spec Revisions Locally

Use this procedure to add, edit, and delete specification revisions locally. For more information, see *Manage Spec Revisions Locally* (on page 276).

Manage Spec Revisions Globally

Use this procedure to maintain specification revisions in batch mode, using global revision options. For more information, see *Manage Spec Revisions Globally* (on page 277).

View and Print Spec Revisions

Use this procedure to view and print archived revisions belonging to existing specs. By default, the dialog box displays all archived revisions in the more <plant>. For more information, see *View and Print Spec Revisions* (on page 278).

Compare Current Data with a Saved Revision

Use this procedure to compare data in the current specification with a specification that was archived as a previous revision. This option enables you to generate a report that shows the data changes. You can also set fonts and color to display the changes. For more information, see *Compare Current Data with a Saved Revision* (on page 278).

Compare Current Data with a Saved Spec

Using this option you can compare data in the current specification with a specification that you saved as an .isf file. This option enables you to generate a report that shows the data changes. You can also set fonts and color to display the changes. For more information, see *Compare Current Data with a Saved Spec* (on page 278).

View Data History

SmartPlant Instrumentation can indicate specification data changes by comparing current data with the data stored in the audit trail repository for the date range that you specify. You can set a color to mark changes, set a shade of gray to emphasize the changed data in printed reports and their previews, and also set bold and italic font style for emphasis on the screen and in print. History indication is available only if the System Administrator has activated the audit trail functionality. When the audit trail functionality is activated, each time that you save data after making changes, the data is recorded in the audit trail repository. For more information, see *View Data History* (on page 279).

Change Storage Method of Specification Revisions

Use this procedure to convert specification revisions from one storage format to another. By default, the software stores spec revisions in the database and compresses the revision data automatically to save space. You can save revisions to the SmartPlant Instrumentation database or as external .psr files, or compress them and save as a single .zip file. You can only perform this procedure after the Domain Administrator, in the **Report Management** dialog box, specifies the folder for saving spec revisions as .psr or .zip files. Saving revisions in .zip or .psr format is useful when you have made a large number of revisions, and want to reduce the size of your database. For more information, see *Change Storage Method of Specification Revisions* (on page 280).

Delete Spec Revisions

Use this procedure to delete one or more spec revisions in batch mode. You can select and delete revisions that belong to different specs. For more information, see *Delete Spec Revisions* (on page 280).

Manage Spec Revisions Locally

1. Open a spec.
2. Do one of the following:
 - Click **Actions > Revisions**.
 - On the toolbar, click .
3. In the **Revisions** dialog box, select one of the revision numbering methods (use **P0**, **P1**, **P2...** for preliminary revisions or **0**, **1**, **2** / **A**, **B**, **C**, and so forth for normal serial revisions).

TIPS

- When you first select a revision numbering method, several options are available to you, including preliminary revisions (designated by P0, P1, P2...). After you select one of the other revision methods, you can no longer return to the preliminary revision method and this option becomes disabled.
- When working with revisions in an integrated environment, the revision numbering methods are not available for selection.

- Only the last five revisions appear in the **Revisions** dialog box, or in the revision title block. To view all revisions of the current spec, click **Actions > Compare with Revision**.
4. Click **New** to add new revision data or update the existing data as desired.

TIPS

 - SmartPlant Instrumentation automatically adds a new line with the next logical character and date each time you click **New** after you select the initial method.
 - If you are working in an integrated environment in a module that supports publishing and retrieving of documents, clicking **New** opens the **Revise** dialog box for the integrated environment instead of the SmartPlant Instrumentation **Revisions** dialog box.
 5. Add or edit the revision data in the appropriate boxes.

TIP

The **By** box contains the current user's initials by default, if previously defined by the System Administrator in the Administration module. You can also edit this setting if required.
 6. To delete revisions locally you no longer require, select the revisions and click **Delete**.

Manage Spec Revisions Globally

1. In the main **SmartPlant Instrumentation** window, click **Tools > Global Revisions**.
2. On the **Settings** tab, under **Activity**, do one of the following:
 - Select **Add Revision** to add revisions to instrument tags without checking the current revision settings.
 - Select **Upgrade Revision** to add revisions to instrument tags according to defined criteria.
3. Enter the required revision information.
4. Click the **Specifications** tab.
5. Select all or particular specs that you want to revise.

TIPS

 - To select multiple specs, use the Shift or Ctrl key.
 - Multi-tag specs only appear at the end of the list when you select the **Select all** check box. The **Tag Number** box displays the text SEE LIST with the number of the master tag enclosed in parentheses.
6. Click **Apply** to add the revisions to the specs of the selected instrument tags.

TIPS

 - If any of the specs selected for revision is assigned to a Specification Binder package, that spec does not undergo a revision and the software displays an appropriate message. Afterwards, a list of the specs that were not revised is displayed, and the reason appears in the **Comment** field.
 - You can click **Print** to print the list of specs for which the revision failed, or click **Save As** to save the list to a file. These buttons appear after the software could not revise certain specs.

View and Print Spec Revisions

1. In the Specifications module, click **Actions > Spec Revisions**.
2. Under **Revision filter**, define filter parameters as needed and then select **Apply**.

TIPS

- By default, the dialog box displays all archived revisions in the <plant>. You can select a specific plant group to filter the revisions accordingly. To revert to the default display, in the **Plant group** box, select the empty row. Also, you can filter revisions by spec form number, or type a specific number in the **Revision** box.
 - You can also search for a revision by tag number or document number by entering the appropriate values under **Find**.
3. In the data window, select one or more revisions that you want to view or print out, and click **OK**.

Compare Current Data with a Saved Revision

1. Open a spec.
2. Click **Tools > Data Comparison Display Options** and set font and color settings for comparison as you require.
3. On the **Actions** menu, click **Compare with Revisions** to open a dialog box with a list of available revisions for the current spec.
4. Select a revision and click **OK**.
5. In the dialog box that opens, click **Yes** to preview the report, or **No** to print the report without previewing.

TIPS

- If you clicked **Yes** to preview the report, close the preview window to see the specification with the changes indicated.
- The report shows the names of the columns that were changed: **Spec Report Value** shows the current data, and **External Spec Value** shows external file data.
- SmartPlant Instrumentation displays your specification with changed fields indicated according to your settings in the **Data Comparison Display Options** dialog box.

Compare Current Data with a Saved Spec

1. Open a spec.
2. Click **Tools > Data Comparison Display Options** and set font and color settings for comparison as you require.
3. On the **Actions** menu, click **Compare with External**.
4. In the **Select File for Comparison** dialog box, navigate to the required .isf file and click **OK**.
5. In the dialog box that opens, click **Yes** to preview the report, or **No** to print the report without previewing.

TIPS

- If you clicked **Yes** to preview the report, close the preview window to see the specification with the changes indicated.

- The report shows the names of the columns that were changed: **Spec Report Value** shows the current data, and **External Spec Value** shows external file data.
- SmartPlant Instrumentation displays your specification with changed fields indicated according to your settings in the **Data Comparison Display Options** dialog box.

View Data History

NOTE History indication is available only if the System Administrator has activated the audit trail functionality. When the audit trail functionality is activated, each time that you save data after making changes, the data is recorded in the audit trail repository.

1. Open a spec.
2. Click **Options > History Options**.
3. Do one of the following to select the date range for data history comparison:
 - In the **From** and **To** boxes, type the appropriate dates or use the spinners.
 - To set the **To** data field value as today's date, click **Today**.
4. To set a font style to emphasize changes on the screen and in print, select **Bold** or **Italic**, or both check boxes.
5. To change the color used to display changes on the screen, do the following:
 - a. Beside the **Highlight color for display** box, click .
 - b. On the **Color** dialog box, choose the color that you require.
 - c. Click **OK** to save your new color settings and return to the **History Options** dialog box.
6. To change the shade of gray used to emphasize the changed data in printed reports and their previews, do the following:
 - a. Beside the **Grayscale for printing** box, click .
 - b. On the **Grayscale** dialog box, slide the bar to the required position.
 - c. Click **OK** to save your new grayscale settings and return to the **History Options** dialog box.
7. Click **OK** to save your current history options and close the **History Options** dialog box.
8. On the **Options** menu, click **Mark Changes** to mark changes in the current specification for the dates that you specified in the **History Options** dialog box.

TIPS

- To refresh the history indication in an open specification, on the **Options** menu, clear **Mark Changes** and then select this option again.
- The software does not mark changes in a spec note, or in a large note page.

Change Storage Method of Specification Revisions

1. Open the Specifications module.
2. On the **Actions** menu, click **Manage Spec Revisions**.
TIP To display specifications of one revision only, under **Revision filter**, type the revision number and click **Apply**.
3. Under **Select spec revisions**, select one or more revisions whose storage method you want to change.
4. Under **Change storage method**, do one of the following:
 - Select **PSR files** to save each revision as an external .psr file in the location specified in the Administration module. This option is only available after the Domain Administrator, in the **Report Management** dialog box, specifies the folder for saving spec revisions as .psr or .zip files.
 - Select **ZIP file** to save all the selected revisions as a single external .zip file in the location specified in the Administration module. This option is only available after the Domain Administrator, in the **Report Management** dialog box, specifies the folder for saving spec revisions as .psr or .zip files.
 - Select **Database** to save the revision to the SmartPlant Instrumentation database. For this option, the data is automatically compressed to save disk space.
5. Click **Change method**.

Delete Spec Revisions

1. In the Specifications module, click **Actions > Manage Spec Revisions**.
2. Filter revisions as you require.
TIP If you want to display revisions defined for all specs that exist in all of your plant groups, under **Plant group**, select the empty row.
3. Select one or more revisions.
4. Click **Delete**.
TIP When you delete a revision, the software does not delete the spec itself. Deleting a spec, however, always deletes all of the spec revisions automatically.

SECTION 28

Save, Export, and Import Options

SmartPlant Instrumentation supports saving spec data in the following formats:

- .isf (only specs whose item type is Instrument)
- .psr (any single-tag spec, multi-tag spec, or a non-instrument spec)
- .xls (only specs whose item type is Instrument)

To edit a specification in an external application, you need to save the specification in a format that the external application supports. You can export specifications individually or in batch mode. You can export specification data to the following specifications:

- External Editor (supplied with the SmartPlant Instrumentation software package) — Supports working with spec data saved in .isf format, allows you to convert .psr files to .isf format, and import data from .isf files to SmartPlant Instrumentation.
- InfoMaker — Supports working with spec data saved in .psr format, does not allow you to import data from .psr files. You first need to convert .psr files to .isf format in External Editor.
- Excel — Supports working with spec data saved in .xls format, does not allow you to import data from Excel files back to SmartPlant Instrumentation.

Save, Export, and Import Options Common Tasks

Use the following tasks to save specs in .isf, .psr, or .xls format one by one or in batch more. Also, these tasks enable you to import data to specs using External Editor.

Save a Spec in PSR Format

Use this procedure to save a single specification in .psr format for opening in InfoMaker. You cannot work with .psr files in External Editor. However, in External Editor, you can then convert .psr files to .isf format, and edit the specification data as you require. For more information, see *Save a Spec in PSR Format* (on page 282).

Save an Instrument Spec in ISF Format

Use this procedure to save an instrument specification document in .isf format so that you can open it in External Editor, which is supplied with SmartPlant Instrumentation. You can use External Editor to view and edit specifications. After editing, you can import the changed data back into your specs in SmartPlant Instrumentation. For more information, see *Save an Instrument Spec in ISF Format* (on page 283).

Save Instrument Specs in Batch Mode

Use this procedure to save a group of selected instrument specifications. You can save a batch of instrument specs either as .psr files or .isf files. If you choose the .psr format, you can then open the .psr files in InfoMaker. Saving specs in .isf format allows you to edit the specs in External Editor, which is supplied with SmartPlant Instrumentation. For more information, see *Save Instrument Specs in Batch Mode* (on page 283).

Save an Instrument Spec in Excel Format

Use this procedure to save a currently open instrument specification in Excel format. For more information, see *Save an Instrument Spec in Excel Format* (on page 283).

Batch Save of Instrument Specs in Excel Format

Use this procedure to select a group of instrument tags and save their specifications in Excel format. For more information, see *Batch Save of Instrument Specs in Excel Format* (on page 284).

Protect Fields Before Exporting Specs to External Editor

Use this procedure to protect all or specific fields whose values you do not want to be available for editing in External Editor. After you save the spec as an .isf file, and open it in External Editor, the fields that you protected appear as view- only. For more information, see *Protect Fields Before Exporting Specs to External Editor* (on page 284).

Import Data to a Specification from an External File

Use this procedure to import data from an external specification file in .isf format to the current specification. If the format of the external specification is .psr, you can use External Editor to convert the files to .isf format. The external specification must be based on the same form as the target specification. If you attempt to copy data from a specification based on a different form, the software displays an appropriate message. For more information, see *Import Data to a Specification from an External File* (on page 285).

Import Data to Instrument Specs in Batch Mode

You can import data from external files to instrument specifications in batch mode. You need to specify a source file folder and then select the .isf files from which you want to import data. The software imports data to instrument specifications by matching the tag numbers in the source .isf files and target specifications that exist in SmartPlant Instrumentation. SmartPlant Instrumentation does not support importing data in batch mode to multi-tag (see list) specs. For more information, see *Import Data to Instrument Specs in Batch Mode* (on page 285).

Save a Spec in PSR Format

1. Open a specification.
2. Click **Actions > Save As**.
3. Select **Original**, and click **OK**.
4. In the dialog box that opens, under **Save as type**, select **PowerSoft Report (PSR) format (*.PSR)**.
5. Select the folder where you want to save the files, type the name of the target .psr file, and click **Save**.

Save an Instrument Spec in ISF Format

1. Open an instrument specification that you want to save in .isf format.
2. Click **Actions > Export Data**.
3. In the **Save to File** dialog box, select the folder where you want to save the files.
4. Enter the target file name, and click **Save**.

NOTE SmartPlant Instrumentation does not support saving non-instrument specifications in .isf format.

Save Instrument Specs in Batch Mode

1. Open the Specifications module, and click **Actions > Save as Files**.
2. In the **Save as Files** dialog box, under **Select file format**, do one of the following:
 - Select **ISF** to save the files in .isf format for opening in External Editor.
 - Select **PSR** to save the files in .psr format for opening in InfoMaker.
3. Click **Browse**.
4. In the **Select Folder** dialog box, specify a desired folder, and click **Save**.
5. Click **Find**.
6. In the **Find Items** dialog box, define search parameters as you require and click **Find** to display a list of tags according to the search parameters.
7. Select one or more tags and click **OK** to return to the **Save as Files** dialog box.
8. In the **Save as Files** dialog box, click **OK**.

NOTE Saving specifications as .psr or .isf files in batch mode is only available when the specification item type is Instrument.

See Also

Single-Tag Specs (see "Single-Tag Specifications" on page 235)

Save an Instrument Spec in Excel Format

1. Open an instrument specification.
2. Click **Actions > Save as Excel**.

TIP In the generated Excel files, graphic elements within title blocks display as designed. SmartPlant Instrumentation does not support export of other graphic elements to Excel format.

See Also

Save as Excel (on page 287)

Batch Save of Instrument Specs in Excel Format

1. In the main window of the Specifications module, click **Actions > Save as Excel**.
2. In the dialog box that opens, find specs that you want to save in Excel format.
3. In the **Search results** data window, select the instrument tags whose specs you want to save in Excel format.

TIPS

- After you install a new SmartPlant Instrumentation version or service pack, if you previously saved specifications in Excel format, rename the previous result files or move them from the target folder. You can change the default settings for the target folder, on the **Preferences > Specifications > Save as Excel** tab.
 - If you previously saved specs in Excel format, and do not want to overwrite existing result files, you should rename the previous files or move them from the target folder.
 - If you previously saved multi-tag specifications in Excel format and then made changes to the format upon which these specifications are based, you should rename the previous result files or move them from the target folder before exporting further specifications based on that format.
4. Click **OK** to start exporting the spec data to Excel.

TIPS

- In the generated Excel files, graphic elements within title blocks display as designed. SmartPlant Instrumentation does not support export of other graphic elements to Excel format.
- Specifications sharing a common form are saved in a common Excel file. For example, specs based on form 11 might be saved in file T_Form11_0.xls. To set the preferences to create an individual Excel file for each spec, on the **Preferences > Specifications > Save as Excel** tab, under **Saving method**, select **Separate file for each tag**.

See Also

Save as Excel (on page 287)

Protect Fields Before Exporting Specs to External Editor

1. On the Specifications module toolbar, click  to open the **Spec Data Dictionary**.
2. In the **Select Specification Form** dialog box, select the form for which you want to set field protection, and click **OK**.
3. On the **Spec Data Dictionary** toolbar, click  to open the **Field Properties** tab.
4. Do one of the following:
 - To protect individual fields, on the **Column Headers** tab, under **Editable in IEE**, clear the check boxes for the fields you want to protect.
 - To protect all of the fields belonging to a given database table, click the **Tables** tab, and then, under **Editable in IEE**, click **No**.
5. On the toolbar, click  to save the changes.

NOTE You perform this procedure at the form level. This means that the fields that the field protection applies to any instrument specification based on this form. Field protection does not apply to existing specs saved as .isf files.

Import Data to a Specification from an External File

IMPORTANT When importing data to an existing spec, the software can overwrite existing data. To prevent all automated overwriting of existing specification data, in the **Preferences** dialog box, under **Data copying options**, select **Copy without overwriting existing data**. Also, in the **Spec Data Dictionary**, you can set fields as unavailable for editing in the form data template or in specs based on the current form.

1. Open a specification in the specifications module.
2. Click **Actions> Import Data**.
3. In the **Open File** dialog box, select the source .isf file.
4. Click **Open** to import the data from the source file to the specification.

TIP If the imported data includes manufacturers and models that do not appear in the Instrument Manufacturer or Instrument Model supporting tables, the software automatically adds them during the import process.

5. Edit the specification as necessary and then click  to save the changes.

Import Data to Instrument Specs in Batch Mode

NOTE SmartPlant Instrumentation does not support importing data in batch mode to multi-tag (see list) specs.

1. In the Specifications module, click **Actions > Import Data**.
2. Beside **Source folder**, click **Browse** to specify the folder where the source .isf files are located.

TIP In the **Log file name and path** box, the software displays the default path of the log file IMPORT_ISF.LOG. SmartPlant Instrumentation creates this file after importing data. If you previously imported data, this log file already contains records of the previous import session. If you do not change the log file path for the current import session, the software adds new records of the current import session in the same file. To create a new file IMPORT_ISF.LOG, you can click **Browse** and specify a different log file path.

3. Under **Select source files**, select the desired .isf files.

TIPS

- When importing data to an existing spec, the software can overwrite existing data. To prevent all automated overwriting of existing specification data, in the **Preferences** dialog box, under **Data copying options**, select **Copy without overwriting existing data**. Also, in the **Spec Data Dictionary**, you can set fields as unavailable for editing in the form data template or in specs based on the current form.
- If you select **Ignore form ID in database**, the software imports data into specifications even when in the source and target specifications, the internal ID numbers of the specification form are different.

4. Click **Import**.

SECTION 29

Save as Excel

You can use SmartPlant Instrumentation Save as Excel options to save specifications in Microsoft Excel format. You can then use any of the Excel functionalities to edit the exported specifications. The software allows you to save all specs that share a common spec form to a single Excel file. For example, you can save specifications based on form 11 in file T_Form11_0.xls. If needed, you can set the Save as Excel preferences so that you can create an individual Excel file for each specification. The default target folder is the **SPI_SaveAsExcel** folder under the user's base folder.

NOTE To locate the user's base folder, click the Windows **Start > Run > %userprofile%**.

You can specify a different path and folder by changing the **Save as Excel** preferences.

The Excel workbook opens displaying the specification with the lowest tag number. If the file that you opened contains multi-page specs, each page is displayed on a separate Excel worksheet. If you exported multi-tag specifications, the multi-tag list is displayed on the Excel **See List** worksheet. The notes are displayed on the Excel **Notes** worksheet.

NOTES

- In Excel 2003, you need to set macro security to Medium.
- In Excel 2007, to turn pages, click the **Add-Ins** tab and then click the appropriate arrow.

Supported Spec Types

You can only use Save as Excel options with specs whose item type is Instrument (single-tag or multi-tag specs). SmartPlant Instrumentation does not support Save as Excel options for specs whose item type is other than instrument, or whose form contains page sections.

NOTE If you previously saved multi-tag specifications in Excel format and then made changes to the format upon which these specifications are based, you should rename the previous result files or move them from the target folder before exporting further specifications based on that format.

Font Style

Regardless of the font of the original specification, the text font style in the target Excel file is Arial.

Graphics and Other Embedded Objects

Graphic elements, for example, the logo image, or other .bmp graphics are not shown in the target Excel file. SmartPlant Instrumentation does not support export of embedded objects to Excel, for example, equations.

Customizing Specs for Save as Excel Common Tasks

Before you save a specification in Excel format, you need to check the source spec for elements that can cause various display problems in Excel. The following topics describe how to customize your spec page to avoid display some of possible displays problems in Excel.

Guidelines for Customizing Pages for Save as Excel

In general, specs based on SmartPlant Instrumentation library pages export accurately to Excel. However, if you want to save specs in Excel format, you might need to familiarize yourself with the following guidelines, that enable you to fine-tune your spec pages and save specs accurately in Excel format. After you create forms and specifications based on such pages, you can then save these specs accurately in Excel format. For more information, see *Guidelines for Customizing Pages for Save as Excel* (on page 289).

Guidelines for Customizing PSR Files for Save as Excel

In general, specs based on SmartPlant Instrumentation library pages export accurately to Excel. When you customize .psr pages in InfoMaker, use these guidelines for compatibility with Excel. After you import such pages into SmartPlant Instrumentation, include them in a form, and generate specs based on this form, you can then save these specs accurately in Excel format. For more information, see *Guidelines for Customizing PSR Files for Save as Excel* (on page 290).

Create an Invisible Vertical Zero Line

Use this procedure to Open a Form Page in InfoMaker and create an invisible vertical grid line for which the X values are 0. If a form upon which specifications are based contains vertical fields, it must fulfill one of the following two conditions for correct export to Excel:

- The X values of the left-hand vertical grid line must be 0.
- You create an invisible line for which the X values are 0.

Modifying a form to fulfill either of these conditions can also improve the display of other features, for example, select lists. For more information, see *Create an Invisible Vertical Zero Line* (on page 291).

Replace Double Lines with Thick Single Lines

There are several situations in which a particular choice of line elements within a form yields non-standard Excel spreadsheets following a Save as Excel operation. Use this procedure if your specification is based on a form that contains double grid lines. Use of double lines instead of single thick lines can cause a display problem in Excel. For more information, see *Replace Double Lines with Thick Single Lines* (on page 292).

Correct a Line Discontinuity

In general, a spec page is divided into three side-by-side components — parameter categories, field headers, and field values. For correct translation to Excel, perform this procedure so that a horizontal row line that spans more than one vertical component becomes a continuous line rather than separate lines with imprecise continuity. For more information, see *Correct a Line Discontinuity* (on page 292).

Correct Horizontal and Vertical Divergence of Grid Lines

Use this procedure to correct horizontal and vertical divergence of grid lines. Lines that are not exactly horizontal or lines that are not exactly vertical can be sources of display problems when you save SmartPlant Instrumentation specifications in Excel format. For more information, see *Correct Horizontal and Vertical Divergence of Grid Lines* (on page 292).

Set Value Display Precision for Save as Excel Globally

Use this procedure to set the number of decimal digits that you want to display in the Excel cells after saving specs in Excel format. The default global Save as Excel precision is two decimal places. In general, process data and calculation values that SmartPlant Instrumentation stores in the database are of greater precision than the values that Excel displays in the cells of generated specs. You perform this procedure in SmartPlant Instrumentation. For more information, see *Set Value Display Precision for Save as Excel Globally* (on page 293).

Set Value Display Precision for Individual Fields

Use this procedure to override the global precision for individual fields in a particular spec page. In general process data and calculation values that SmartPlant Instrumentation stores in the database are of greater precision than the values that Excel displays in the cells of generated specs. When you save a specification as an Excel file, SmartPlant Instrumentation reformats the display precision for Excel. The default global Save as Excel precision is two decimal places. You perform this procedure in InfoMaker. For more information, see *Set Value Display Precision for Individual Fields* (on page 293).

Guidelines for Customizing Pages for Save as Excel

Graphic Limitations of the Excel Environment

The **Page Editor** of SmartPlant Instrumentation allows you freedom in designing specification pages, with few limitations on the layout of data fields, fields with computed values, text fields, and lines. But when designing pages for Excel compatibility, it is important to keep in mind that an Excel worksheet is basically a grid of cells. Although a standalone Excel spreadsheet supports random placement of text, value, and line objects, Save as Excel works best if you imagine an Excel grid underlying your page.

Fine-Tuning the Grid and Lines

Although you can use the mouse to create and place lines, you must fine-tune the grid by referring to the **Line Position** pop-up window for each line object. After you set the major lines of the page grid, you can insert database fields, computed fields, text fields, and lines. Verify the following:

- All lines are either exactly vertical lines or exactly horizontal.
- For every vertical line, BeginX = EndX.
- For every horizontal line, BeginY = EndY.
- Left/right external border lines share common BeginY (top) and EndY (bottom) values.
- Top/bottom external border lines share common BeginX (left end) and EndY (right end) values.
- When one line ends by running into another, make sure that they share an X value or a Y value. This prevents overshooting and undershooting.
- Create as much of the grid as possible before creating text and value objects.

- Although there is no requirement for every line to run the entire length or width of the page, imagine an Excel grid underlying your page. For example, if you inserted a vertical line near the top of the page at $X = 500$ PBU, if your mouse placement of a vertical line near the bottom of the page ended up at $X = 505$, make the X values consistent for both lines.
- Similarly, if you inserted a horizontal line towards the left of the page at $Y = 700$ PBU, if your mouse placement of a horizontal line towards the right of the page ended up at $Y = 705$, make the Y values consistent for both lines.

Left-Aligning Fields to Lines

During the process of export from SmartPlant Instrumentation to Excel, the software associates each field with a vertical line to the left of the field. To display the lines accurately, make sure the BeginX value of a field should equal the X values of the line to its left.

Fine-Tuning Adjacent Fields

- To prevent text cut-off, leave at least 5 PBU between adjacent fields. The requirement to left-align fields to lines also applies to fields to the right of other fields.
- For multiple fields between horizontal lines, set constant BeginY and EndY values for all of the fields. The BeginY value should be several PBU greater than the Y values of the line above, and the EndY value should be several PBU less than the Y values of the line below.

Guidelines for Customizing PSR Files for Save as Excel

Graphic Limitations of the Excel Environment

InfoMaker allows you to modify existing SmartPlant Instrumentation spec pages, with few limitations on the layout of text, value, line, and other objects. When designing InfoMaker pages for Excel compatibility, it is important to keep in mind that an Excel worksheet is basically a grid of cells. Although a standalone Excel spreadsheet supports random placement of text, value, and line objects, Save as Excel works best if you imagine an Excel grid underlying your InfoMaker page. You cannot create an entirely new page in InfoMaker.

Fine-Tuning the Grid and Lines

Although you can use the mouse to create and place lines, you must fine-tune the grid by referring to the **Properties > Position** tab for each line object. Verify the following:

- All lines are either exactly vertical lines or exactly horizontal.
- For every vertical line, $X1 = X2$.
- For every horizontal line, $Y1 = Y2$.
- Left/right external border lines share common $Y1$ (top) and $Y2$ (bottom) values.
- Top/bottom external border lines share common $X1$ (left end) and $X2$ (right end) values.
- When one line ends by running into another, make sure that they share an X value or a Y value. This prevents overshooting and undershooting.
- Create as much of the grid as possible before creating text and value objects.
- Although there is no requirement for every line to run the entire length or width of the page, imagine an Excel grid underlying your InfoMaker page. For example, if you inserted a vertical line near the top of the page at $X = 500$ PBU, if your mouse placement of a vertical line near the bottom of the page ended up at $X = 505$, make the X values consistent for both lines.
- Similarly, if you inserted a horizontal line towards the left of the page at $Y = 700$ PBU, if your mouse placement of a horizontal line towards the right of the page ended up at $Y = 705$, make the Y values consistent for both lines.

Left-Aligning Fields to Lines

After you set the major lines of the page grid, you can insert data fields and field headers, computed fields, fields displayed as select lists, check boxes, or option buttons. During the process of export from SmartPlant Instrumentation to Excel, the software associates each field with a vertical line to the left of the field. To ensure accurate display, the X1 value of a field should equal the X values of the line to its left. The following lines are acceptable:

- A visible vertical line on the left edge of the field
- A visible vertical line, with X value equal to the X1 value of the field, but on a higher or lower part of the page
- A vertical grid line, with X value equal to the X1 value of the field, and on the **Properties > General** tab, the **Visible** check box is cleared. Even for such an invisible line, imagine an Excel grid underlying your InfoMaker page. For example, if you inserted an invisible vertical line in one part of the page at X = 500 PBU, if your field placement at another part of the page ended up at X1 = 505, make the X values consistent for both lines. For each invisible line, make sure that the icon to the right of Visible is displayed as . If the icon is displayed as , click it, and in the dialog box that opens, delete the contents of the **Expression** pane, and then click **OK**.

Fine-Tuning Adjacent Fields

- To prevent text cut-off, leave at least 5 PBU between adjacent fields. The requirement to left-align fields to lines also applies to fields to the right of other fields.
- For multiple fields between horizontal lines, set constant Y1 and Y2 values for all of the fields. The Y1 value should be several PBU greater than the Y values of the line above, and the Y2 value should be several PBU less than the Y values of the line below.

Create an Invisible Vertical Zero Line

1. In SmartPlant Instrumentation, save the spec page as a .psr file and then open the .psr file in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).
2. On the menu bar, click **Insert > Control > Line**.
3. On the **General** tab of the **Properties** dialog box, do the following:
 - a. Under **Name**, type **I_coordinator**.
 - b. Clear the **Visible** check box.
 - c. Make sure that the icon to the right of **Visible** is displayed as . If the icon is displayed as , click it, and in the dialog box that opens, delete the contents of the **Expression** pane, and then click **OK**.
4. On the **Position** tab, type the following settings:
 - a. **X1: 0**
 - b. **Y1: 0**
 - c. **X2: 0**
 - d. **Y2:** Type a value equal to or greater than the highest **Y2** value on the form.
5. On the menu bar, click **File > Save**.
6. Import the page back into SmartPlant Instrumentation.
7. Regenerate the spec page and specification, and save the specification again in Excel format.

Replace Double Lines with Thick Single Lines

1. In SmartPlant Instrumentation, save the spec page as a .psr file and then open the .psr file in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).
2. Click the duplicate line, and then press the Delete key.
3. Right-click the remaining line, and on the shortcut menu click **Properties**.
4. On the **General** tab of the **Properties** dialog box, under **Pen Width**, use the spinners to set the new width of the line.
5. On the menu bar, click **File > Save**.
6. Import the page back into SmartPlant Instrumentation.
7. Regenerate the spec page and specification, and save the specification again in Excel format.

See Also

Save a Page as an External File (on page 206)

Open a Page from an External File (on page 204)

Correct a Line Discontinuity

1. In SmartPlant Instrumentation, save the spec page as a .psr file and then open the .psr file in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).
2. Right-click the right-most line segment, and on the shortcut menu, click **Properties**.
3. On the **Position** tab, under **X2**, copy the value to the Clipboard, using a standard Microsoft shortcut (for example, Ctrl+C).
4. For each line segment to the right of the left-most segment, click the line segment, and then press Delete.
5. Right-click the left-most line segment, and on the shortcut menu, click **Properties**.
6. On the **Position** tab, under **X2**, paste the Clipboard value, using a standard Microsoft shortcut (for example, Ctrl+V).
7. On the menu bar, click **File > Save**.
8. Import the page back into SmartPlant Instrumentation.
9. Regenerate the spec page and specification, and save the specification again in Excel format.

See Also

Save a Page as an External File (on page 206)

Open a Page from an External File (on page 204)

Correct Horizontal and Vertical Divergence of Grid Lines

1. In SmartPlant Instrumentation, save the spec page as a .psr file and then open the .psr file in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).
2. To correct a horizontal divergence, do the following:
 - a. Right-click the divergent line, and on the shortcut menu click **Properties**.
 - b. On the **Position** tab of the **Properties** dialog box, set the value under **X1** equal to the value under **X2**.
3. To correct a vertical divergence, do the following:
 - a. Right-click the divergent line, and on the shortcut menu click **Properties**.
 - b. On the **Position** tab of the **Properties** dialog box, set the value under **Y1** equal to the value under **Y2**.

- c. On the menu bar, click **File > Save**.
4. Import the page back into SmartPlant Instrumentation.
5. Regenerate the spec page and specification, and save the specification again in Excel format.

See Also

Save a Page as an External File (on page 206)

Open a Page from an External File (on page 204)

Set Value Display Precision for Save as Excel Globally

1. In SmartPlant Instrumentation, click **File > Preferences > Specifications > Save as Excel**.
2. Under **Accuracy level**, enter the number of decimal digits that you want to display in specs you save in Excel format.
3. Regenerate the Excel files for specs that you require.

TIPS

- If you want to set value display precision for a specific field, you need to open the spec page in InfoMaker, and then reformat the appropriate field as needed. For details, see *Set Value Display Precision for Individual Fields* (on page 293).
- You can also reformat individual fields in the Excel sheet, setting the appropriate number of decimal places. However, you need to reformat these fields each time after saving this SmartPlant Instrumentation specification in Excel format.

Set Value Display Precision for Individual Fields

1. In SmartPlant Instrumentation, save the spec page as a .psr file and then open the .psr file in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).
2. For each field that you want to format, do the following to set the number of decimal places that are displayed in SmartPlant Instrumentation and later in Excel:
 - a. Click in the field.
 - b. On the **Format** tab of the **Properties** dialog box, under **Format**, type **0.** followed by pound signs (#) to indicate the required number of decimal places. For example, **0.** indicates no decimal places, **0.#** indicates one decimal place, **0.###** indicates three decimal places, and so forth.
3. On the menu bar, click **File > Save as File**.
4. On the **Select File Name** dialog box, type the file name that you require.
5. Import the page back into SmartPlant Instrumentation.
6. Regenerate the spec page and specification, and save the specification again in Excel format.

See Also

Save a Page as an External File (on page 206)

Open a Page from an External File (on page 204)

Save as Excel Troubleshooting

After saving a specification in Excel format, scan the resulting file for display errors. The following list describes how to troubleshoot some of the possible errors.

Resolve Spec Accessing Problem in a Common Excel File

Use this procedure to be able to access every spec successfully after saving multiple specs in a common Excel file. The procedure deals with changing Excel macro security to Medium. If you are running Excel XP, macro security is set to High by default. For more information, see *Resolve Spec Accessing Problem in a Common Excel File* (on page 296).

Remove the Protection from a Spec Saved as Excel

Use this procedure to remove the protection from a spec; For more information, see *Remove the Protection from a Spec Saved as Excel* (on page 296).

Resolve a Data Saving Problem

Use this procedure if you receive an error message stating that you "cannot save data... incorrect syntax" when you try to save specs in Excel format. This problem can occur if your specifications are based on pages arranged with the text headers above the fields, rather than in separate vertical groupings. You can use a headers-above-fields style, and avoid the error message by editing the x-coordinates of either the text headers or the fields to creating microscopic misalignment. This procedure deals with editing the text headers. After editing in InfoMaker, your pages can support specifications that you save in Excel format. For more information, see *Resolve a Data Saving Problem* (on page 296).

Resolve Grid Line Overlap Problems

This topic provides a solution you need to implement in InfoMaker when labels and values overlap lines above or below. For more information, see *Resolve Grid Line Overlap Problems* (on page 297).

Correct Undershooting and Overshooting of Grid Lines

Use this procedure to correct grid line display problems caused by correcting imperfect meeting of the outermost grid lines in the source spec page. You can use this procedure to correct undershooting, when the lines do not meet, and overshooting, when at least one of the lines extends beyond the meeting point. For more information, see *Correct Undershooting and Overshooting of Grid Lines* (on page 297).

Prevent Truncation of Labels and Values

This topic provides a troubleshooting solution you need to implement in InfoMaker when the right end of labels and values is displayed cut off. For more information, see *Prevent Truncation of Labels and Values* (on page 298).

Fix Displaced Labels

When you save specifications in Excel format, you may find displaced labels in the categories column — by default at the left of the page — or in the title block. This problem can be caused by lack of coordination between the SmartPlant Instrumentation spec page upon which the specification is based and the row division in the Excel spreadsheet. You have two options to assign the displaced label to a row: extend an existing horizontal line to pass above or below the displaced label, or normalize label coordinates, which you do by assigning to the displaced label the Y-coordinate of a row that spans the rest of the form. For more information, see *Fix Displaced Labels* (on page 298).

Fix Text Display in Excel Cells

Use this procedure to fix incomplete display of text in a spec saved as Excel. You can perform this procedure either in Excel or InfoMaker. Cell content can be improperly displayed due to the width of the Excel columns. This can occur in the following situations:

- If the text string in a cell is longer than the width of the cell, and the cell to the right is empty, the text extends into the adjacent cell.
- If the text string in a cell is longer than the width of the cell, and the cell to the right is not empty, the overlapping text is cut off.
- If the cell is very narrow, no data appears in the cell. By inserting the mouse pointer in the cell, you can view the cell contents in the formula bar.

For more information, see *Fix Text Display in Excel Cells* (on page 299).

Fix Function Conversion Problems

Use this procedure to convert manually those SmartPlant Instrumentation functions used in the spec into Excel functions if automatic conversion was not successful. When you save a specification in Excel format, SmartPlant Instrumentation converts its functions into Excel functions. Where the conversion does not succeed, SmartPlant Instrumentation enters the calculated result into the relevant cell of the Excel spreadsheet, and does not display a formula in the formula bar. This problem is likely to occur if you created your own specification function in InfoMaker. For more information, see *Fix Function Conversion Problems* (on page 299).

Set Value Display Precision

Use this procedure if you encounter problems in process data or calculation value display precision in the Excel cells after saving specs in Excel format. In general, process data and calculation values that SmartPlant Instrumentation stores in the database are of greater precision than the values that Excel displays in the cells of generated specs. The default global Save as Excel precision is two decimal places. Therefore, if you need to display in Excel a precise SmartPlant Instrumentation value, you need to increase the number of decimal digits for Save as Excel. You can either set values display precision globally, or for individual fields. For more information, see *Set Value Display Precision* (on page 300).

Fix Display of Vertical Fields

Use this procedure if vertical fields are not displayed correctly the Excel file. If a spec page upon which specifications are based contains vertical fields, it must fulfill one of the following two conditions for correct export to Excel:

- The X values of the left-hand vertical grid line must be 0.
- You create an invisible line for which the X values are 0.

If aligning the page grid lines to $X = 0$ does not solve the problem, you need to trim and center vertical form fields in InfoMaker. For more information, see *Fix Display of Vertical Fields* (on page 300).

Fix Display of Select Lists

Use this procedure if select lists are not displayed correctly the Excel file. For more information, see *Fix Display of Select Lists* (on page 301).

Prepare Problematic Excel Files for Intergraph Support

Use this procedure if you encounter problems that you are unable to solve, and then contact Intergraph Support. For more information, see *Prepare Problematic Excel Files for Intergraph Support* (on page 301).

Resolve Spec Accessing Problem in a Common Excel File

Use the following procedure for Excel 2003.

1. In Excel, on the menu bar, click **Tools > Options**.
2. On the **Security** tab, click **Macro Security**.
3. On the **Security Level** tab, click **Medium**.
4. Click **OK** to close the **Security** dialog box.
5. Click **OK** to close the **Options** dialog box.

Use the following procedure for Excel 2007:

1. In Excel, click the Office button.
2. Click the **Excel Options** button.
3. Click **Trust Center > Trust Center Settings > Macro Settings**.
4. Select the **Disable all macros with notification** option.
5. Click **OK**.

Remove the Protection from a Spec Saved as Excel

For Excel 2003:

- With a spec open in Excel, on the menu bar, click **Tools > Protection > Unprotect sheet**.

For Excel 2007:

With a spec open in Excel, click **Office Button > Excel Options > Microsoft Office Excel Trust Center > Trust Center Settings > Macro Settings > Enable all macros**.

Resolve a Data Saving Problem

1. Save the spec page upon which the specification is based in .psr format and then open the .psr file in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).
2. Right-click the required text header, and then, on the shortcut menu click **Properties**.
3. On the **Position** tab, under **X**, increase the previous value by **0.1**
4. Repeat this step for every header that is located precisely above its field.
5. Import the page back into SmartPlant Instrumentation.
6. Regenerate the spec page and specification, and save the specification again in Excel format.

Resolve Grid Line Overlap Problems

1. Open the appropriate spec page in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).
2. In InfoMaker, make sure that lines that intersect near problematic fields do not overshoot. Overshooting occurs when grid lines meet imperfectly, and at least one of the lines extends beyond the meeting point. If overshooting occurs, see *Correct Undershooting and Overshooting of Grid Lines* (on page 297).
3. If there is no overshooting, make sure that you set constant Y1 and Y2 values for all of the objects between the lines. The Y1 value should be several PBUs (PowerBuilder units) greater than the Y values of the line above, and the Y2 value should be several PBUs less than the Y values of the line below.
4. Import the page back into SmartPlant Instrumentation.
5. Regenerate the spec page and specification, and save the specification again in Excel format.

Correct Undershooting and Overshooting of Grid Lines

1. In SmartPlant Instrumentation, save the spec page as a .psr file and then open the .psr file in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).
2. To correct undershooting or overshooting on the left border, do the following:
 - a. Right-click the top line or on the bottom line, and on the shortcut menu click **Properties**.
 - b. On the **Position** tab, under **X1**, copy the value to the Clipboard, using a standard Microsoft shortcut (for example, Ctrl+C).
 - c. Right-click the required horizontal line, and on the shortcut menu, click **Properties**.
 - d. On the **Position** tab, under **X1**, paste the Clipboard value, using a standard Microsoft shortcut (for example, Ctrl+V).
3. To correct undershooting or overshooting on the right border, do the following:
 - a. Right-click the top line or the bottom line, and on the shortcut menu click **Properties**.
 - b. On the **Position** tab, under **X2**, copy the value to the Clipboard, using a standard Microsoft shortcut.
 - c. Right-click the required horizontal line, and on the shortcut menu, click **Properties**.
 - d. On the **Position** tab, under **X2**, paste the Clipboard value, using a standard Microsoft shortcut.
4. To correct undershooting or overshooting on the top border, do the following:
 - a. Right-click the left-most line or the right-most line, and on the shortcut menu click **Properties**.
 - b. On the **Position** tab, under **Y1**, copy the value to the Clipboard, using a standard Microsoft shortcut.
 - c. Right-click the required vertical line, and on the shortcut menu, click **Properties**.
 - d. On the **Position** tab, under **Y1**, paste the Clipboard value, using a standard Microsoft shortcut.
5. To correct undershooting or overshooting on the bottom border, do the following:
 - a. Right-click the left-most line or the right-most line, and on the shortcut menu click **Properties**.
 - b. On the **Position** tab, under **Y2**, copy the value to the Clipboard, using a standard Microsoft shortcut.

- c. Right-click the required vertical line, and on the shortcut menu, click **Properties**.
 - d. On the **Position** tab, under **Y2**, paste the Clipboard value, using a standard Microsoft shortcut.
6. On the menu bar, click **File > Save**.
7. Import the page back into SmartPlant Instrumentation.
8. Regenerate the spec page and specification, and save the specification again in Excel format.

See Also

Save a Page as an External File (on page 206)

Open a Page from an External File (on page 204)

Prevent Truncation of Labels and Values

1. In SmartPlant Instrumentation, save the spec page as a .psr file and then open the .psr file in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).
2. For accurate export to Excel, fine-tune problematic areas of the page in InfoMaker according to plumb line principles:
 - The X positions of vertical lines and X1 and X2 object positions should not be used randomly.
 - For considerations of graphic design and for compatibility with Excel, set close values equal.
3. Save the file.
4. Import the page back into SmartPlant Instrumentation.
5. Regenerate the spec page and specification, and save the specification again in Excel format.

See Also

Save a Page as an External File (on page 206)

Open a Page from an External File (on page 204)

Fix Displaced Labels

1. Open the problematic spec in the **Page Editor** in SmartPlant Instrumentation.
2. Save the spec page as a .psr file and then open the .psr file in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).
3. To normalize label coordinates, do the following:
 - a. Right-click the field to the right of the displaced label, and on the shortcut menu, click **Properties**.
 - b. On the **Position** tab, under **Y**, copy the value to the Clipboard, using a standard shortcut (for example, Ctrl+C).
 - c. Right-click the displaced label, and on the shortcut menu, click **Properties**.
 - d. On the **Position** tab, under **Y**, paste the Clipboard value, using a standard shortcut (for example, Ctrl+V).

TIP The value of the **Height** field on the **Position** tab can also influence the appearance of the text in Excel. You must enter a height value that is in proportion to the font size that you set in the Font tab folder.

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 4. On the **File** menu, click **Save**.

TIP You only need to perform the following steps if you want to fix displaced labels by extending an existing horizontal line above or below the displaced label. These steps deal with extending a line that runs through the right-hand and the middle column into the left-hand (categories) column. You can adapt this procedure for other configurations as well.

5. To extend an existing horizontal line above or below the displaced label, do the following:
 - a. Right-click the left-most line (vertical), and on the shortcut menu click **Properties**.
 - b. On the **Position** tab, under **X1**, copy the value to the Clipboard, using a standard shortcut (for example, Ctrl+C).
 - c. Right-click the horizontal line that you want to extend, and on the shortcut menu, click **Properties**.
 - d. On the **Position** tab, under **X1**, paste the Clipboard value, using a standard shortcut (for example, Ctrl+V).
6. Click in the main window to view your changes.
7. On the **File** menu, click **Save**.
8. Import the page back into SmartPlant Instrumentation.
9. Regenerate the spec page and specification, and save the specification again in Excel format.

See Also

Save a Page as an External File (on page 206)

Open a Page from an External File (on page 204)

Fix Text Display in Excel Cells

1. If you want to fix text display directly in Excel, do one of the following:
 - In Excel, drag the column borders to accommodate the text.
 - In Excel, on the **Excel Format Cells** dialog box, on the **Alignment** tab, select **Wrap text**.
2. If you want to fix text display directly in InfoMaker, do the following:
3. Open the problematic spec in the **Page Editor** in SmartPlant Instrumentation.
4. Save the spec page as a .psr file and then open the .psr file in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).
5. and increase the width of this column as necessary.
6. On the **File** menu, click **Save**.
7. Import the page back into SmartPlant Instrumentation.
8. Regenerate the spec page and specification, and save the specification again in Excel format.

Fix Function Conversion Problems

1. Open the problematic Excel file.
2. Copy the value of the unknown function from the original cell to a temporary cell.
3. Copy the unknown function from the log file to the original cell.

TIPS

- In Excel 2003, the log files are located in <SmartPlant Instrumentation home folder>\SaveAsExcel\ResultFiles\.
- In Excel 2007, the log files are located in C:\Documents and Settings\[user name]\SPI_SaveAsExcel

- The file names are created according to the convention LogFileFormXXX_#.txt, where XXX is the form number and # relates to the internal change made to the form.
- 4. In the original cell, modify the exported function to convert it into an Excel function.
- 5. Move the mouse pointer outside the cell to display the value of the function.
- 6. Compare the value displayed in the Excel cell with the value in the source specification. If the values are identical, this is an indication (but not a proof) that you have accurately converted the formula.
- 7. If you succeed in converting the function, delete the contents of the temporary cell.

TIPS

- If you re-save the same specification in Excel format, to prevent the software from overwriting your new function, you must rename the corrected Excel file. You can then copy the formula to future Excel versions of this specification.
- If the converted formula does not work, restore the original cell contents from the temporary cell, and then contact Intergraph Support.

Set Value Display Precision

- To set value display precision globally, see *Set Value Display Precision for Save as Excel Globally* (on page 293).
- To set value display precision for individual fields and override the global value precision settings, see *Set Value Display Precision for Individual Fields* (on page 293).

Fix Display of Vertical Fields

1. In SmartPlant Instrumentation, save the spec page as a .psr file and then open the .psr file in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).
2. Right-click a vertical field, and then, on the shortcut menu, click **Properties**.
3. To verify that a given field diverges from the horizontal, on the **Font** tab, click the icon to the right of the **Escapement** box  or . On the dialog box that opens, in the **Expression** box, a value of **900**, for example, indicates a vertical field.
4. On the **General** tab of the **Properties** dialog box, under **Alignment**, select **Center**.
5. If the field is wider than the text, do one of the following to trim the field:
 - On the **Position** tab, under **Width**, change the value to the minimum value needed to display the actual text.
 - In the **Design** view, use the mouse to change the field width.
6. On the **File** menu, click **Save**.
7. Import the page back into SmartPlant Instrumentation.
8. Regenerate the spec page and specification, and save the specification again in Excel format.

See Also

Save a Page as an External File (on page 206)

Open a Page from an External File (on page 204)

Fix Display of Select Lists

- To fix the display of select lists in Excel, you need to create an invisible vertical zero line in the problematic spec page. For details, see, *Create an Invisible Vertical Zero Line* (on page 291).

Prepare Problematic Excel Files for Intergraph Support

1. In SmartPlant Instrumentation, click **File > Preferences > Specifications > Save as Excel**.
2. Select **Delete temporary Excel files**, and click **OK**.
3. Save the problematic specifications in Excel format.
4. For each problematic specification, send the following files to Intergraph Support:
 - From the <SmartPlant\Instrumentation home folder>\SaveAsExcel\ResultFiles folder send T_Form*.xls and LogFileForm*.txt (or the <tag number>.xls)
 - From the <SmartPlant\Instrumentation home folder>\SaveAsExcel\DataFiles folder, send Data*.xls and Form*.xls.

SECTION 30

Specification Report List

The following table shows a description of each Specifications module report that is available for displaying and printing.

Report	Description	Note
Specifications by Item Type	Allows you to print all specs belonging to items of a particular item type, or print specs according to your item selection..	For loop spec or instrument spec report generation, you can select the current plant group or all plant groups available in your plant structure.
Specifications by Form	Allows you to print specs according to specific forms on which the specifications are based.	For loop spec or instrument spec report generation, you can select the current plant group or all plant groups available in your plant structure.
Specifications by Document Number	Allows you to print specifications according to specified document numbers.	This option allows you print all existing spec belonging to any item type.
Form Data Templates	Allows you to select form data templates and print a report showing the form data template content.	None
Spec Forms	Allows you to print specific forms.	You can set the software to generate the report with or without field names. The software generates the report as the specprn.psr file and saves this file to the folder you specified in the Temporary folder path box, on the General page of the Preferences dialog box. If you leave this box blank, the software saves the specprn.psr file to the SmartPlant Instrumentation home folder.
Specifications by Date	Allows you to print specs belonging to items of a particular item type according to specified date range.	For loop spec or instrument spec report generation, you can select the current plant group or all plant groups available in your plant structure.
Spec Form Field Report – Per Form	Displays the field names and their respective headers for the forms.	The field headers are displayed as they appear in the Spec Data Dictionary . You can select a specific form or all available forms.
Spec Form Field Report – Per Field	Contains spec form names where a selected field appears.	You can select a specific field name or all available field names.

Report	Description	Note
Spec Form Select List	Contains a list of fields that appear as select lists in the form, with all the possible values for each field.	None
Spec Form Lists by Process Function	Contains a list of specification forms and instrument types associated with the specified process functions.	You can select one or more process functions. Forms belonging to a particular process function appear on a separate sheet.
Spec Pages by Form	Contains a list of pages associated with the forms that you select.	This report only shows a list of pages in the form, not the fields that are used in the page. Pages used in a particular form appear on a separate sheet.
Print Specs into PDF Files	Allows you to print the specifications that you select into a common .pdf file.	None

Printing Specifications and Reports Common Tasks

The following tasks enable you to generate and print various spec-related reports.

Print a Specification Report

Use this procedure to print a report of specifications that are based on the same spec form. In the procedure topic, the report for specifications according to selected forms is shown as an example. You need to have access to the Specifications module to print spec reports. The steps involved in printing most of the Specifications module reports are similar. For more information, see *Print a Specification Report* (on page 305).

Generate Reports by Date

Use this procedure to set a date range and then generate a report of all spec forms that underwent changes within this date range. For more information, see *Generate Reports by Date* (on page 306).

Generate a Report for a Selected Field Name

Use this procedure to generate a Spec Form Field Report for a certain data field that is in use in spec forms. This report indicates the forms that use this data field, and also indicates the headers that you assigned to this field in the **Spec Data Dictionary** for the various forms. For field headers that you did not edit in the **Spec Data Dictionary**, this report prints the headers that appear in the pages that the form contains. For more information, see *Generate a Report for a Selected Field Name* (on page 306).

Assign User-Defined Headers for Spec Form Field Reports

Use this procedure to edit form headers or to assign user-defined headers to the data fields in a selected form. The header changes affect Spec Form Fields reports and Form Browser views that you create in the Browser module. This procedure does not affect the display of specifications based on a form that you edit in the **Spec Data Dictionary**, nor does this procedure influence printed specifications. For more information, see *Assign User-Defined Headers for Spec Form Field Reports* (on page 306).

Print the Currently Open Specification

Use this procedure to print out the currently open specification. The Specifications module preferences that you set on the **Preferences** dialog box determine how the software prints specification notes. For more information, see *Print the Currently Open Specification* (on page 307).

Print Specs into PDF Files

Use this procedure to print specifications into a single .pdf file, or to individual .pdf files. For more information, see *Print Specs into PDF Files* (on page 307).

Print a Specification Report

1. Click **File > Preferences > General**, and make sure you set the SmartPlant Instrumentation temporary folder path correctly, for example, C:\Program Files\SmartPlant\Instrumentation\TEMP.
2. On the **Specifications Module** window menu bar, click **Reports > By Forms**.
3. Do one of the following:
 - Click **Current Plant Group** if you want to print reports for specs belonging to the current <unit> plant group only.
 - Click **All Plant Groups** to be able to print reports for specs that exist in all of the available plant groups in the current plant structure.
4. Select one or more forms and click **OK**.
5. If prompted, click **Yes** to preview the report, or click **No** to print the report without opening the print preview.

TIPS

- By default, the software prompts you to open a print preview. You can also change this setting on the **Preferences** dialog box, on the **General** page.
- By default, the software prints specification notes on a separate sheet. You can change this setting on the **Preferences** dialog box, on the **Specifications > General** page.

NOTE The page size of specification and wiring reports is hard-coded to A4, therefore only this setting will apply when printing these reports.

Generate Reports by Date

1. On the **Specifications Module** window menu bar, click **Reports > By Date**.
2. Do one of the following:
 - Click **Current Plant Group** if you want to print reports for specs belonging to the current <unit> plant group only.
 - Click **All Plant Groups** to be able to print reports for specs that exist in all of the available plant groups in the current plant structure.
3. Type or select the required date range in the **From** and **To** boxes.
TIP Click **Today** to display the current date in the **To** box.
4. Click **OK** to save the date range settings for current report generation.
5. If prompted, click **Yes** to preview the report, or click **No** to print the report without opening the print preview.

TIPS

- By default, the software prompts you to open a print preview. You can also change this setting on the **Preferences** dialog box, on the **General** page.
- By default, the software prints specification notes on a separate sheet. You can change this setting on the **Preferences** dialog box, on the **Specifications > General** page.

Generate a Report for a Selected Field Name

1. On the **Specifications Module** window menu bar, click **Reports > Spec Form Field Report - Per Field > Selected Field Name**.
2. On the **Select Field Name** dialog box, select the required data field and click **OK**.
TIP If the list of data fields is long, start typing a field name in the **Find** box and the software selects the field name automatically as you type.
3. Click **OK** and then, if prompted to preview the report, click **Yes** to open the report print preview, or **No** to print the report without opening the print preview.

Assign User-Defined Headers for Spec Form Field Reports

1. On the **Specifications Module** window menu bar, click **Edit > Spec Data Dictionary**.
2. On the **Select Specification Form** dialog box, select a form and click **OK**.
3. On the toolbar, click .
4. To edit the field headers for Spec Form Field reports, do one of the following:
 - On the **Field Properties** tab, change individual headers by typing a text string instead of the displayed header.
 - Change headers in batch mode using another form as a source. To do so, click **Copy From**, and then, select a source form.
5. To apply existing headers of the current form, do the following:
6. In the form, or on the **Field Properties** tab, under **Header**, move the cursor to the header, and after the cursor changes its shape to  , click the header.

7. In the form, double-click the header to display it on the **Field Properties** tab.

TIPS

- If you apply existing headers of the current form, in the form display, the form fields are marked with a background the cyan background color. The background color of the currently selected field, for which you are editing the header, changes to magenta.
- The  icon in the **Field Properties** tab points to the corresponding header, which is now available for editing.

Print the Currently Open Specification

1. On the **Specifications > General** page of the **Preferences** dialog box, do one of the following:
 - Select **Show notes** to include spec notes on the first page of the spec.
 - Clear **Show notes** to omit spec notes from the first page of the spec.
2. On the **Specifications > General** page of the **Preferences** dialog box, do one of the following:
 - Select **Print notes on a separate sheet** to print the spec notes section on a separate print sheet.
 - Clear **Print notes on a separate sheet** to print the spec notes section as displayed on the spec.
3. Open a spec and, do one of the following:
 - Click **Actions > Print**.
 - On the toolbar, click .

Print Specs into PDF Files

NOTE The driver used for printing the PDF files, SmartPlant PDF Converter 401, is included in the SmartPlant installation.

1. On the **Specifications Module** window menu bar, click **Reports > Print Specs into PDF Files**.
2. On the **Print Specs into PDF Files** dialog box, do one of the following:
 - Click **Print all into one file** and then specify the target file name and path. This allows you to create one .pdf file shared for all specifications.
 - Click **Print into individual files** and then specify the target folder for the software to create an individual .pdf file for each specification.

TIP When creating individual .pdf file names for item specifications, the software uses the names of the items as a source. If the item name includes characters other than alphanumeric characters (that is, /(#) and so forth), the software converts them to underscores. The software retains hyphens and spaces. For example, if the item name is 101-FT-100\B, the created .pdf file name is 101- FT-100_B.pdf. If the item name is 12P#20 TYPE E I/OAS (CUSTOM), the created .pdf file name is 12P_20 TYPE E I_OAS_CUSTOM_.pdf.

3. **Browse** to define **PDF file name** and folder.

NOTE If you selected **Print all into one file**, and the file name you define already exists in the target folder, you will be asked whether or not to overwrite the file. If you click **No**, the **Select Folder** dialog box will reopen, and a number suffix will be added to the file name. You can edit the new file name and click **Save** to proceed. If you click **Yes**, the original file is deleted.

4. Click **Find**.
5. On the **Find Items** dialog box, find items for which you want to print to specifications to a .pdf file.

TIP On the **Find Items** dialog box, the software only displays items for which specifications already exist.
6. Under **Search results**, select items whose specifications you want to print into one or several .pdf files, and then click **OK**.
7. On the **Print Specs into PDF Files** dialog box, click **OK**.

SECTION 31

Pipe Specs

Pipe spec is a specification that defines pipe properties for various process conditions. In SmartPlant Instrumentation, the term pipe spec denotes a set of requirements for materials and construction of the pipelines and their components. You can include this information in a specification that defines various process conditions for a specific pipe. In SmartPlant Instrumentation, pipe specs are used for references and as a guideline for design in the areas affected by direct contact with process. These references include pipeline information in the Process Data module and installation item details you can display in hook-up drawings.

In a hook-up drawing, you can display all instrument you associate with a particular pipe spec. You make pipe spec definitions using the Pipe Specs supporting table, available either from the Instrument Index or Process Data module. After making your pipe spec definitions, you can assign a pipe spec to one or more lines in the Process Data or Instrument Index module. Also, you can assign a pipe spec to one or more instruments in the Browser or Instrument Index module. You do not use the Specifications module options to generate or manage pipe specs.

You then assign pipe specs to user-defined hook-up item sub-libraries and affect instrument - hook-up assignment. After assigning a pipe spec to a user-defined sub-library, when making instrument - hook-up associations, you can only use instruments that have the source pipe spec data. You cannot use the default sub-sub-library for pipe spec assignment.

Pipe Specs Common Tasks

The following tasks deal with pipe spec management. Pipe spec is a specification that defines various process conditions for a specific pipe.

Define or Modify Pipe Specs

Use this procedure to define pipe specs in the Pipe Specs supporting table. You can perform this procedure either in Instrument Index or process data module. For more information, see *Define or Modify Pipe Specs* (on page 310).

Assign Pipe Specs to Instruments

You can assign pipe specs to instrument tag numbers in the Browser module or in the default view of the Instrument Index Standard Browser accessed from the Instrument Index module. You have to assign pipe specs to tag numbers if you want to use pipe-spec sub-libraries in the Hook-Ups module and assign the tag numbers to hook-ups. Prior to assigning pipe specs to instrument tag numbers, you make pipe spec definitions in the Pipe Specs supporting table, which you can access either from the Instrument Index or from the Process Data module. In these modules, you can also assign pipe specs to line numbers. For more information, see *Assign Pipe Specs to Instruments* (on page 311).

Assign Pipe Specs to Lines

Use this procedure to can assign pipe specs to lines. You can then display the pipe spec definition in the line process data sheet. For more information, see *Assign Pipe Specs to Lines* (on page 311).

Associate Pipe Specs with Sub-Libraries

Use this procedure to associate one or more pipe specs with user-defined sub-libraries. After the association, when assigning instruments to hook-ups, you can only use instruments that have the source pipe spec data. You cannot use the default sub-library for pipe spec assignment. For more information, see *Associate Pipe Specs with Sub-Libraries* (see "Associate Pipe Specs with Sub-Libraries" on page 312).

Display Pipe Specs Assigned to a Hook- Up Item Sub-Library

Use this procedure to displays pipe specs associated with a specific user-defined hook-up item sub-library. For more information, see *Display Pipe Specs Assigned to a Hook-Up Item Sub-Library* (on page 312).

Dissociate a Pipe Spec from Lines

Use this procedure to dissociate a pipe spec from a line. You must perform this procedure if you need to delete this pipe spec from the Pipe Specs supporting table. For more information, see *Dissociate a Pipe Spec from Lines* (on page 313).

Delete Pipe Specs

Use this procedure to delete a pipe spec from the Pipe Specs supporting table. You can perform this procedure either in the Instrument Index or Process Data module. For more information, see *Delete Pipe Specs* (on page 313).

Define or Modify Pipe Specs

1. Do one of the following:
 - On the **Instrument Index Module** window menu bar, click **Tables > Lines**.
 - On the **Process Data Module** window toolbar, click  to open the **Select Line** dialog box..
2. From the **Line type** list, select a line type.
3. Click **New** to open the **Line Properties** dialog box.
4. Beside the **Pipe spec** list, click  to open the **Pipe Specs** dialog box.
5. Do one of the following:
 - To create a new pipe spec, click **New** and type the pipe spec name and description.
 - To edit an existing pipe spec, click a field in a selected row and modify the existing pipe spec name and description as needed.

Assign Pipe Specs to Instruments

1. Open the **Browser Manager**, and then, for the Instrument Index Standard Browser, define a view that includes the **Tag Number** and **Pipe Spec** fields.
2. In the **Pipe Spec** column, from the select list, select a pipe spec for association with the instrument whose tag number is displayed in the same row, in the **Tag Number** column.

TIPS

- You can assign the same pipe spec to more than one instrument but only one pipe spec per instrument.
- To dissociate a pipe spec from an instrument, from the select list in **Pipe Spec** column, select a blank field.
- After you assign tags to hook-ups in the Hook-Ups module, you can open a view for the Hook-Up Tag List browser. This browser displays only those tags that are associated with hook-ups. In this browser view, you can also change the pipe spec associations as you require.

Assign Pipe Specs to Lines

1. Do one of the following:
 - On the **Instrument Index Module** window menu bar, click **Tables > Lines**.
 - On the **Process Data Module** window toolbar, click  to open the **Select Line** dialog box..
2. From the **Line type** list, select a line type.
3. Select a line and click **Properties**.
4. On the **Line Properties** dialog box, beside the **Pipe spec** list, click  to open the **Pipe Specs** dialog box.
5. Select a pipe spec and click **OK** to assign it to the line.

TIPS

- You can now open a process data sheet for this line to display the assigned pipe spec. If you defined more than one pipe spec in the Pipe Specs supporting table, you can assign a different pipe spec to the line from the process data sheet.
- The pipe spec becomes a property of the process data sheet. This means that you can assign this pipe spec to other lines by copying line data to other lines. Note, however, that when you copy line data to instruments, the software does not copy line pipe spec definition to the instruments.

Associate Pipe Specs with Sub-Libraries

1. In the **Hook-Up Item Libraries** folder of the **Reference Explorer**, do one of the following:
 - In the tree view pane, expand the hierarchy of an item library and right-click a user-defined sub-library.
 - In the tree view pane, select an item library and then, in the **Items** pane, select one or more user-defined sub-libraries.
2. On the shortcut menu, click **Actions > Associate Pipe Specs with Sub- Libraries**.

TIPS

- On the dialog box that opens, the software displays all the pipe specs defined in the Pipe Specs supporting table.
 - In the dialog box panes, you can double-click the **Pipe Specs** column header in the to sort the items in ascending order. Double- click the header again to sort the items in descending order.
3. Under **Available pipe specs**, select one or more pipe specs and do one of the following:
 - Click **Associate**.
 - Drag the selected items to the **Associated pipe specs** pane.
 4. If you selected more than one user-defined sub-library in the **Reference Explorer**, click **Next** to display another sub-library and associate pipe specs as you require.

TIP You can associate the same pipe specs with more than one user-defined sub-library.

Display Pipe Specs Assigned to a Hook-Up Item Sub-Library

1. Press F7 to open the **Domain Explorer**, and expand the hierarchy to the hook-up type level in the **Hook-Ups** folder.
2. Do one of the following:
 - In the tree view pane, select a specific hook-up.
 - In the tree view pane, select a hook-up type, and then, in the **Items** pane, select and right-click one or more hook-ups.
3. On the shortcut menu, click **Properties**.
4. On the **Hook-Up Properties** dialog box, from the **Hook-up sub-library** list, select a user-defined hook-up item sub-library.
5. Click **Pipe Specs** to display pipe specs associated with the user-defined sub-library that you selected.

TIP The **Pipe Specs** button is only available when the sub-library that you selected is user-defined.

Dissociate a Pipe Spec from Lines

1. Do one of the following:
 - On the **Instrument Index Module** window menu bar, click **Tables > Lines**.
 - On the **Process Data Module** window toolbar, click  to open the **Select Line** dialog box..
2. From the **Line type** list, select a line type.
3. Select a line and click **Properties**.
4. On the **Line Properties** dialog box, in the **Pipe Spec** column of the data window, click the pipe spec definition and press the Delete key.
5. Click **OK** to return to the **Select Line** dialog box.

TIPS

- This procedure only allows you do dissociate a pipe spec from one line at a time. If you want dissociate this pipe spec from all lines, you can open the process data sheet for a specific line, make sure that the **Pipe spec** box is empty, and then copy line data to other lines.
- You do not delete the pipe spec itself, only dissociate it from the line. The dissociated pipe spec remains in the Pie Specs supporting table. If you want to delete a pipe spec permanently, you must delete it from the supporting table.
- Dissociating a pipe spec from a line does not dissociate this pipe spec from instruments.

Delete Pipe Specs

1. Do one of the following:
 - On the **Instrument Index Module** window menu bar, click **Tables > Lines**.
 - On the **Process Data Module** window toolbar, click  to open the **Select Line** dialog box.
2. From the **Line type** list, select a line type.
3. Click **New** to open the **Line Properties** dialog box.
4. Beside the **Pipe spec** list, click  to open the **Pipe Specs** dialog box.
5. Select the pipe spec that you want to delete, and click **Delete**.
6. Repeat the previous step for each pipe spec that you want to delete.

TIP You cannot delete a pipe spec that is currently assigned to lines. First, dissociate the pipe spec from the lines.

SECTION 32

Using KKS Naming Conventions in SmartPlant Instrumentation

IMPORTANT For the KKS naming convention to function the Rule Manager option must be selected in the Domain Definitions. You then, in Rule Manager using the **KKS Cable Name** rule, set the number of segments to be used in the calculation of the unique suffix number in the KKS name.

SmartPlant Instrumentation supports KKS naming conventions for process-related identification of the following item types:

- Instruments (including functional requirement tags and virtual tags)
- Loops
- Lines
- Process equipment
- Control system tags
- Panels (plant panels only, belonging to panel categories available in the **Convention** list in the **Naming Conventions** dialog box)
- Cables (plant cables only)

For each of these item types, the following KKS segment properties are available:

KKS Level Name	Property	Description
Total Plant	Total Plant	Single character (numeric or alphabetic).
System Code	System Code Prefix (optional)	Single digit.
	System Classification	Three-character alphabetic key, selected from a standard list, that represents the type of system in use the plant.
	System Numbering	Two-digit number with leading zeros.
Equipment Unit Code	Equipment Unit Classification	Two-character alphabetic key, selected from a standard list, that represents the type of equipment within the system used for measuring or monitoring the system, or the type of measurement circuit (level, flow, and so forth).
	Equipment Unit Numbering	Three-digit number with leading zeros.
	Equipment Unit Additional Code	Optional character (alphabetic).
Component Code	Component Classification	Two-character alphabetic key, selected from a standard list, that represents the type of component.

KKS Level Name	Property	Description
	Component Numbering	Two-digit number with leading zeros.
Numbering Element (for cables only)	Application Area	Single digit (0-9) representing the application area of a cable (voltage levels).
	Cable Number (digits 2 and 3)	Two-digit number.
	Cable Suffix	The fourth position of the cable number, a numeric character, mostly used for grouping purposes.

NOTES

- SmartPlant Instrumentation does not auto-increment the numbering of the various segments in the process identification.
- The software does not automatically add leading zeros to imported items whose names include spaces. You must manually add the leading zeros to the source before importing KKS data.

Process Identification Prefix and Notation Characters

Process Identification usually uses the equal (=) character as a prefix. Identification may include space (" ") or pipe (|) characters.

Examples

For a medium voltage panel (excluding device panels), only the System Code segments are required in most cases. Thus a suitable KKS name would be 1 0BBA01, where the values are designated as follows:

Property	Value	Description
Total Plant	1	
System Code Prefix	0	
System Classification	BBA	MV distribution board
System Numbering	01	
Equipment Unit Classification	(Not used)	
Equipment Unit Numbering	(Not used)	

For a flow transmitter, the KKS identification 1 0PAE01 CF013 –B01 could be used, where the values are designated as follows:

Property	Value	Description
Total Plant	1	
System Code Prefix	0	
System Classification	PAE	Circulating (main cooling) water pump system
System Numbering	01	
Equipment Unit Classification	CF	Open flow loops

Property	Value	Description
Equipment Unit Numbering	001	
Component Classification	-B	Transducer
Component Numbering	01	

NOTES

- When creating a new instrument, the associated loop inherits the relevant segments of the instrument names and vice versa. Also, KKS naming is propagated to cables when you connect them to panels that already have KKS naming. Cables inherit the KKS naming of the panel whose system code is first in alphabetic order.
- Not all items use all the described segments. For example, DCS and PLC panels do not use equipment unit code and component code segments. Marshaling racks, junction boxes, process equipment, and lines do not use component code segments.
- When editing a name using the KKS naming conventions, do not remove any segments from the name. Removing segments from the KKS name causes problems when creating new instruments. You can though add more segments to the KKS name created in SmartPlant Instrumentation.
- You can change the terminology of a key on a project-specific basis provided that the contents remain unchanged. Make sure that you do not select a code that is designated as **Blocked**. Blocked coding letters are reserved for future technologies and new systems engineering configurations. They may only be allocated and released by the VGB Technical Committee on Technical Classification Systems.

Requirements for Importing Line Data in KKS Mode

When importing line data to the Instrument Index module or Process Data module, you need to perform the following procedure to enable the use of KKS segments in the import link.

1. In the Import Utility, select the desired import link and open the **Link Properties** dialog box.
2. Click the **Style** tab.
3. Select the **Display all fields** check box.

Propagation of KKS Names in SmartPlant Instrumentation

When an item, such as a loop, has KKS naming, and you perform tag number association, the software automatically propagates the loop naming to the associated tags. The software also propagates panel naming when you connect a cable to a panel.

Target Item Type	Inherited Components of Target Item Name	Possible Source Item Type	Example of Source Item Name
Instrument	All populated segments of the loop number	Loop	=1 LBA01 CF001

Target Item Type	Inherited Components of Target Item Name	Possible Source Item Type	Example of Source Item Name
Cable	All common and used process identification segments of the panel (the first system classification which comes in alphabetic order)	Panel	=1 LBA01 CF001 4120 (4120 is the cable numbering, which is entered manually)

For a specific example of loop naming propagation, see *Example of KKS Naming Propagation* (on page 318).

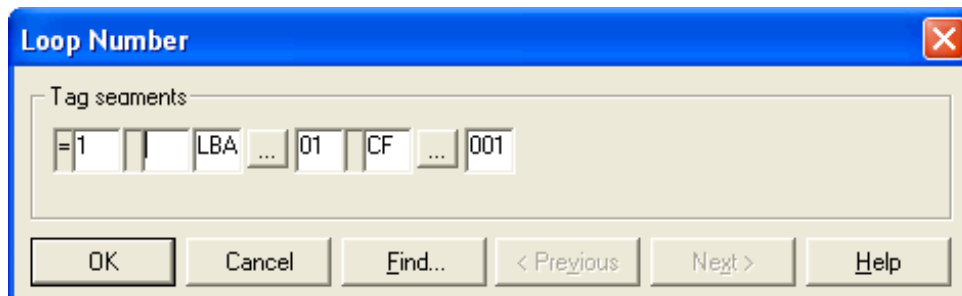
NOTES

- The software performs propagation according to hard-coded rules. Name segments that are not included in a propagation rule remain blank.
- On connecting a cable to a panel, the KKS naming is propagated to the cable. On disconnection, the cable retains the name received by propagation until you reconnect it.
- When editing a name using the KKS naming conventions, do not remove any segments from the name. Removing segments from the KKS name causes problems when creating new instruments. You can though add more segments to the KKS name created in SmartPlant Instrumentation.

Example of KKS Naming Propagation

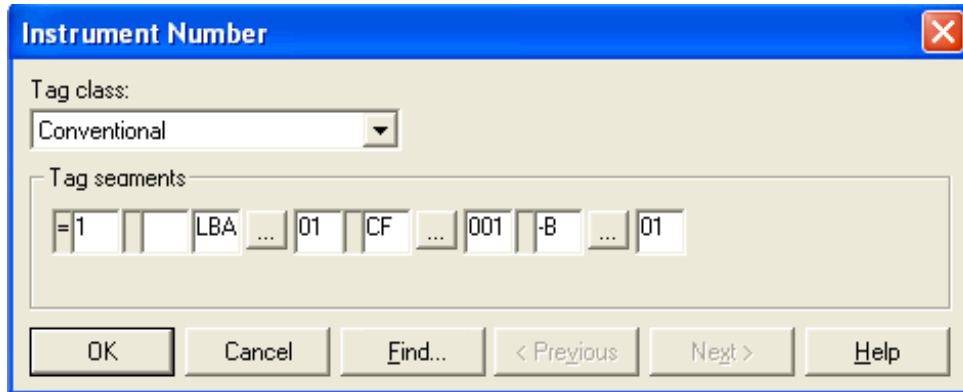
This scenario shows how SmartPlant Instrumentation propagates loop naming to its tag when you create a loop in the **Domain Explorer** and associate a tag with this loop.

1. In the **Domain Explorer**, create a new loop using the following KKS settings:



2. Click **OK** to open the **Instrument Number** dialog box, where you can create a new instrument tag number. At this stage, the software has already propagated all the loop naming settings.

3. Accept the propagated settings, and then define the component classification as shown (-B 01):

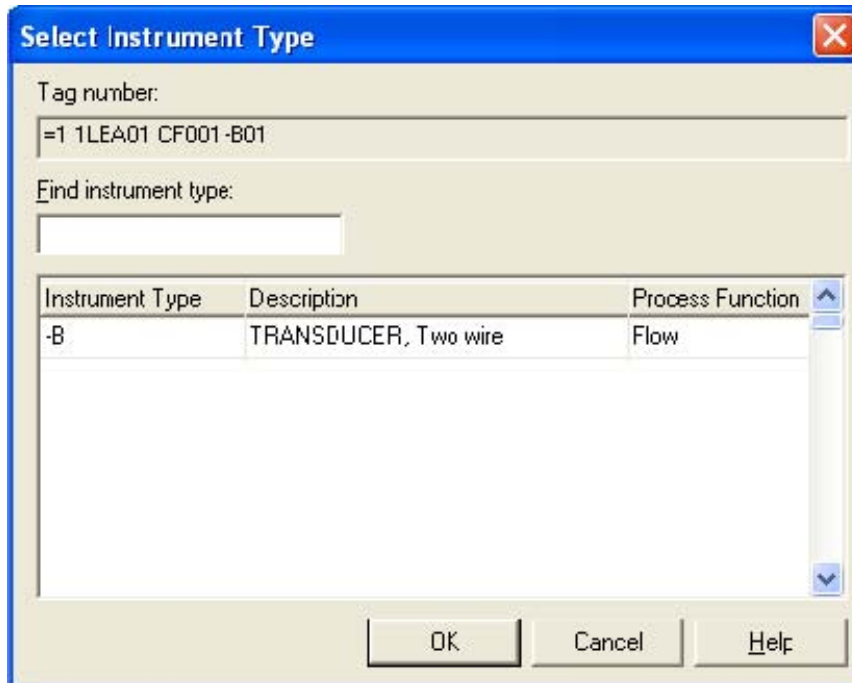


The **Instrument Number** dialog box shows the following configuration:

- Tag class:** Conventional
- Tag segments:** A sequence of boxes containing the following values: =1, LBA, 01, CF, 001, -B, 01.

Buttons at the bottom: OK, Cancel, Find..., < Previous, Next >, Help.

4. Click **OK** to display the **Select Instrument Type** dialog box, where the software displays the instrument type that matches the component classification key value in the instrument tag name:



The **Select Instrument Type** dialog box shows the following configuration:

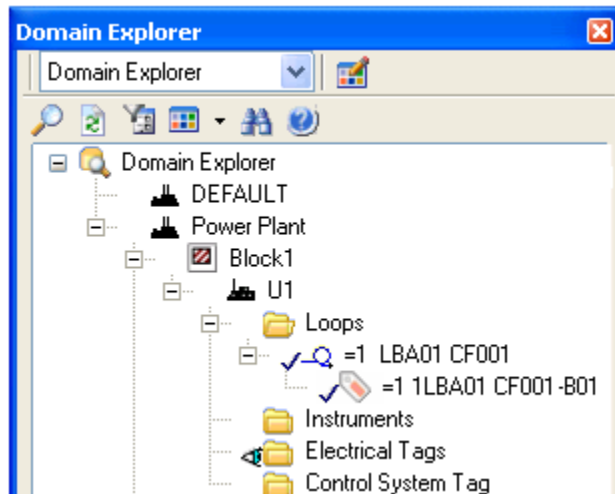
- Tag number:** =1 1LEA01 CF001 -B01
- Find instrument type:** (Empty text box)
- Instrument Type Table:**

Instrument Type	Description	Process Function
-B	TRANSDUCER, Two wire	Flow

Buttons at the bottom: OK, Cancel, Help.

TIP To display the matching instrument types, you must first populate the Instrument Type supporting table with applicable KKS entries.

5. Select the instrument type and click **OK** to display the loop and its tag in the **Domain Explorer**:



IMPORTANT When editing a name using the KKS naming conventions, do not remove any segments from the name. Removing segments from the KKS name causes problems when creating new instruments. You can though add more segments to the KKS name created in SmartPlant Instrumentation.

Rename an Item in KKS Mode

1. In the **Domain Explorer**, select an item such as an instrument and do one of the following:
 - On the item's **Properties** dialog box, beside **Number** (for an instrument), click the ellipsis button .
 - Right-click the item, and on the shortcut menu, click **Rename**.

TIP The name of the field representing the item name varies according to the item type.

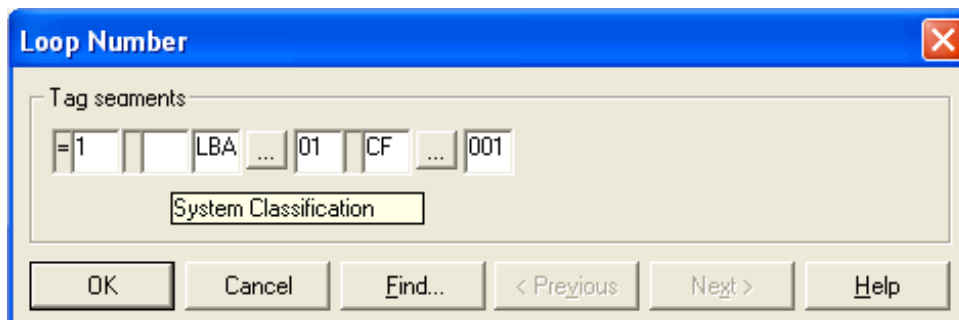
2. Type appropriate values in each segment of the item tag.

IMPORTANT When editing a name using the KKS naming conventions, do not remove any segments from the name. Removing segments from the KKS name causes problems when creating new instruments. You can though add more segments to the KKS name created in SmartPlant Instrumentation.

TIPS

- Press the Tab key to move from one segment box to another.

- Move the mouse pointer over a segment to display a Tool Tip indicating the name of the segment.



- Click the ellipsis button  beside a Classification segment to display the appropriate Classification dialog box, from which you can select suitable values. If you have already typed part of the key prior to clicking the ellipsis button, the **Classification** dialog box opens at the appropriate place in the list.
- When a numeric segment accepts more than one digit, if you enter fewer digits than the maximum, the software automatically adds leading zeros to the value you typed. You cannot remove the leading zeros from the segment.

Scope of KKS Issues for the Current SmartPlant Instrumentation Version

The current version of SmartPlant Instrumentation supports KKS naming conventions for process-related identification of most instrumentation items.

Out of Scope Issues

The following issues are not supported in the current development:

- Configuration rules for KKS establishments
- Grouping of items hierarchically by a common physical system classification or equipment unit
- Point of installation and location identification
- Signal identification (signal area, signal applications, and gated signals)
- Typical loop management
- Loop naming propagation to instruments when renaming the loop
- Searching for items using KKS segments as search parameters. You can, however, search for items using wild cards in the **Find Items** dialog box, in the box where you can enter the full item tag name.
- Telecom options (partially supported, can create telecom tags).
- Macro expansion when importing from SmartPlant P&ID
- Management of KKS classification keys

NOTES

- The software does not automatically increment numbering properties of KKS segments.
- The software does not automatically add leading zeros to imported items whose names include spaces. You must manually add the leading zeros to the source before importing KKS data.

- When creating multiple items, the names of all the items, other than the first one, appear in the interface as zeros, for example: '00000', even though KKS naming is actually applied to them. In such cases, the user needs to rename the individual items by changing the appropriate numbering segment, after which the software displays the item names correctly.
- The software does not reset cable names when you disconnect one of the cable sides from a panel that originally propagated its naming to the cable.
- When renaming a panel, the software does not update the cable naming according to KKS rules.
- If you change the naming convention, it only affects new items. Existing items retain their names according to the previous naming convention.
- The software does not make any validations between the item type and the KKS code.
- The software does not validate imported data. For this reason, you need to check the source data before importing it. It is recommended to use the comparison list before importing line, equipment, or wiring data. For instrument tags and loops, you can map the appropriate segments of the source data to the KKS data segments in SmartPlant Instrumentation.
- Moving a loop to another plant group or associating an instrument or a loop with another loop does not affect the tag naming.
- The software correlates instrument types by name using the KKS component classification. The KKS seed database includes a representative list of instrument types, which you should review and update as needed prior to project execution.

Document Management

In SmartPlant Instrumentation you use the Document Binder module to gather specifications and other related documents that need to be maintained together. Each collection of documents is known as a binder package. You can specify two types of binder package: Specification Binder packages and General Document Binder packages. For Specification Binder packages, you can perform a collective update for all the documents in a single binder package and assign them the same revision number.

IMPORTANT The software does not allow you to perform revisions for Specification Binder packages when working in an integrated environment.

You can group documents according to any criteria you require. However, for instrument specification sheets, a given instrument specification may only be assigned to **one** Specification Binder package **or** to any number of General Document Binder packages, but not to both types of binder packages.

Specification Binder Packages

You use Specification Binder packages to create groups of instrument specifications for whatever purpose you require; for example, when requesting a price quotation from a vendor for several instruments, you can group the instruments together in a Specification Binder package and include other relevant documents.

The following folders are available:

- **Specification List** — This is a cover sheet with instrument tag data for all the specifications included in the Specification Binder package.

- **Form Notes** — This contains user notes that apply to specific form numbers. There must be at least one specification associated with a particular form number in the Specification Binder package in order for you to be able to add form notes.
- **General Notes** — General notes provide a means of adding user comments that are associated with the Specification Binder package as a whole.
- **Specification Sheets** — This category shows the specifications included in the Specification Binder package, and provides you with the options to access and edit individual sheets, to totally or partially revise the sheets in the list, and to print all or some of the sheets.
- **Change Summary Report** — This shows details of the changes that were made to the specifications since the last revision.

When the documents are created, each document type is numbered sequentially using the following method:

- **Specification Sheets**: S-1, S- 2, S-3, and so forth. The pages of a multi-tag specification are identified by a number with a different suffix for each page, for example, S-2.1, S-2.2, S-3.1, S-3.2, and so forth.
- **Form Notes** — G-1, G-2, G-3, and so forth.
- **Change Summary Report** — C-1, C-2, C-3, and so forth.
- **General Notes** — N-1, N-2, N- 3, and so forth.

Page numbers are calculated from the relative position of the document in the Specification Binder package. To recalculate the page numbers after modifying specifications, click **Actions > Repaginate**.

General Document Binder Packages

You use General Document Binder packages to create groups of documents for whatever purpose you require; for example, when requesting a price quotation from a vendor for several items, you can group the items together in a General Document Binder package and include other relevant documents.

The following folders are available:

- **Document List** — This is a cover sheet with data for all the documents included in the General Document Binder package.
- **Document Notes** — This contains user notes that apply to specific document numbers. There must be at least one document associated with a particular document number in the General Document Binder package in order for you to be able to add document notes.
- **General Notes** — General notes provide a means of adding user comments that are associated with the General Document Binder package as a whole.
- **Documents** — This category shows the documents included in the General Document Binder package, and provides you with the options to access and edit individual documents, to totally or partially revise the documents in the list, and to print all or some of the documents.

Document Management Common Tasks

The following tasks are used when you work with a document binder package to gather specifications and other related SmartPlant Instrumentation documents that need to be maintained together.

Start the Document Binder Module

This procedure shows how you open the Document Binder module where you work with document binder packages.

For more information, see *Start the Document Binder Module* (on page 325).

Create a New Binder Package

This procedure shows you how to create a new binder package. A binder package is a group of documents or instrument specifications, and may include additional general notes and form notes. On creation of a new binder package, the software creates a complete set of folders. The software updates these folders as you assign documents to the binder package.

For more information, see *Create a New Binder Package* (on page 325).

Assign an Instrument Specification to a Specification Binder Package

This procedure shows you how after creating a Specification Binder package, you can assign instrument specifications to it. On assigning a specification, the software automatically updates the **Instrument Specification List**. Furthermore, in the browser view, the software sets the value in the **Item Status** column to **Added** for the instrument tags associated with the newly assigned specification.

For more information, see *Assign an Instrument Specification to a Specification Binder Package* (on page 326).

Edit Binder Package Properties

This procedure shows how you can edit the properties of a binder package. You can rename a binder package and edit its description until the first time you add a revision to it. After that you can only edit the purchase order number and requisition number.

For more information, see *Edit Binder Package Properties* (on page 326).

Number Pages in a General Document Binder Package

This procedure shows you how to add consecutive numbering to the documents in a General Binder package.

For more information, see *Number Pages in a General Document Binder Package* (on page 326).

Remove Selected Instrument Specifications From a Specification Binder Package

This procedure show how to remove selected instrument specifications from a Specification Binder package when those specifications are no longer required.

For more information, see *Remove Selected Instrument Specifications From a Specification Binder Package* (on page 327).

Remove a Single Instrument Specification From a Specification Binder Package

This option shows how you can remove a single instrument specification from a Specification Binder package when the specification is no longer required.

For more information, see *Remove a Single Instrument Specification From a Specification Binder Package* (on page 328).

Remove All Instrument Specifications From a Specification Binder Package

This option shows how you can remove all the instrument specifications from a Specification Binder package when the specifications are no longer required.

For more information, see *Remove All Instrument Specifications From a Specification Binder Package* (on page 328).

Delete a Binder Package

This procedure shows you how to delete a binder package. You can only delete a binder package if it has not yet been saved as a revision. In this case, if the binder package includes specifications, these must be removed first.

For more information, see *Delete a Binder Package* (on page 328).

Associate External Files with a Binder Package

These procedures show you how to manage external files that you associate with a binder package. You can associate a new file with the binder package, dissociate a file, or open an associated file. Associated files can be .doc, .txt, .bmp, .wav, .psr files, or any file formats that are supported by your Windows system.

For more information, see *Associate External Files with a Binder Package* (see "Manage Association of External Files with a Binder Package" on page 330).

Start the Document Binder Module

NOTE Before starting this module, confirm with the Domain Administrator that you have been granted appropriate access rights for the tasks you will carry out.

To open the main Document Binder window, do one of the following:

1. On the main toolbar, click .
2. Click **Modules > Document Binder**.

Create a New Binder Package

1. Open the Document Binder module. For details, see *Start the Document Binder Module* (on page 325).
2. In the **Document Binder** window, at the top of the left frame, select  **Binder Packages**.
3. Click **Actions > New Binder Package**.
4. On the **New Binder Package** dialog box, enter the following data:

- The binder package type (required)
- The binder package name (required)
- Description (optional)
- Purchase order number (optional)
- Requisition number (optional)

TIP For Specification Binder packages only, if you select **Apply purchase order and requisition number to all tags**, the software adds this data to all tags currently associated with the Specification Binder package. As long as this checkbox is selected, the software adds this data to every tag that you associate with the Specification Binder package.

5. Click **OK**.

Assign an Instrument Specification to a Specification Binder Package

1. In a Specification Binder package, select the  **Specification Sheets** folder.
2. Click **Actions > Assign Specification**. The **Find Items** dialog box opens, from which you can retrieve tags. To filter the retrieved tags, enter values in the selection fields.
3. Click **Find** to retrieve the list of tags.
4. From the list, select tags to be included in the Specification Binder package and click **OK**. The list of tags appears under the **Specification Sheets** folder for the Specification Binder package.
5. To open a specification for viewing or editing, select a sheet from the list and do one of the following:
 - Click **Actions > Open**.
 - Double-click the sheet.

NOTE To view information in the right area of the window in greater detail, in the tree of the **Preferences** dialog box, expand the hierarchy **Document Binder > Specification Binder** and under **Select instrument specification list display**, select **User-defined columns from Browser module**. When you display detailed data in the right area of the screen, the software determines the layout according to the default view in the **Spec Binder Package Browser** (under the **Document Binder** group). You can customize this view in the Browser module.

Edit Binder Package Properties

1. In the **Document Binder** window, in the left frame, right-click the binder package that you want to edit.
 2. Right-click and from the shortcut menu select **Properties**.
 3. On the **General** tab, edit the following data as needed:
 - Binder package name — after you save at least one revision, this field is not available.
 - Description — after you save at least one revision, this field is not available.
 - Purchase order number.
 - Requisition number.
- NOTE** If you select **Apply purchase order and requisition number to all tags**, the software updates all tags currently associated with the binder package. As long as this checkbox is selected, the software adds this data to every tag that you associate with the binder package.
4. Click **OK**.

Number Pages in a General Document Binder Package

1. Select the General Document Binder package.
2. Do one of the following:
 - Click **Actions > General Document Binder Page Numbering**.
 - Right-click and from the shortcut menu, select **General Document Binder Page Numbering**.

3. On the **General Document Binder Page Numbering** dialog box, select one of the following:
 - **Original page numbering method** — retains the page numbering of each document.
 - **Consecutive page numbering for all documents** — starting with page one, the documents are numbered consecutively.
 - **Consecutive page numbering per document type** — starting with page one, each document type is numbered consecutively but separately from other document types in the binder package.
- IMPORTANT** The **Definitions** button is only enabled when either of the consecutive numbering options is chosen.
4. Click **Definitions**, the **Define Prefix and Suffix** dialog box or the **Define Prefix and Suffix per Document Type** dialog box opens.
5. On the **Define Prefix and Suffix** dialog box, type the prefix and suffix you want to apply to the pages of all the documents in the binder.
6. On the **Define Prefix and Suffix per Document Type** dialog box, do the following:
7. From the **Document Type** list, select the document type you want to apply a prefix and suffix to.
8. In the **Prefix** column, next to the selected document type, type the prefix you want to apply.
9. In the **Suffix** column, next to the selected document type, type the suffix you want to apply.
10. Click **Apply**, to add another prefix and suffix to a different document type.
11. Click **OK** to close the dialog box.

Remove Selected Instrument Specifications From a Specification Binder Package

1. In the **Document Binder** window, in the **Binder Packages** tree, do the following:
2. Expand the Specification Binder package from which you want to remove a specification.
3. Select **Specification Sheets**.
4. Right-click the desired specification sheets, and from the shortcut menu select **Remove Selected Items**.
5. On the **Remove Selected Items** dialog box, under **Select**, select the check box beside each specification that you want to remove.

TIP You can select the **Select all** check box if you want to remove all the specifications.

NOTES

- You can choose whether SmartPlant Instrumentation keeps or deletes revisions that you saved while the specification was part of the Specification Binder package. For details, see Document Binder > General (Preferences).
- On removing a specification, the way in which the specification list is updated depends on the following:
 - If the specification was originally assigned prior to saving the last revision of the Specification Binder package, the instrument tag still appears in the specification list browser view, with the **Tag Number** column set to **Deleted**.
 - If the specification was originally assigned after saving the last revision of the Specification Binder package, its tag does not appear in the specification list.

Remove a Single Instrument Specification From a Specification Binder Package

1. In the **Document Binder** window, in the **Binder Packages** tree, do the following:
2. Expand the Specification Binder package from which you want to remove an instrument specification.
3. Select **Specification Sheets**.
4. In the right pane, select the specification that you want to remove.
5. Click **Actions > Remove**.

NOTES

- You can choose whether SmartPlant Instrumentation keeps or deletes revisions that you saved while the specification was part of the Specification Binder package. For details, see Document Binder > General (Preferences).
- On removing a specification, the way in which the specification list is updated depends on the following:
- If the specification was originally assigned prior to saving the last revision of the Specification Binder package, the instrument tag still appears in the specification list browser view, with the **Tag Number** column set to **Deleted**.
- If the specification was originally assigned after saving the last revision of the Specification Binder package, its tag does not appear in the specification list.

Remove All Instrument Specifications From a Specification Binder Package

1. In the **Document Binder** window, in the **Binder Packages** tree, do the following:
2. Expand the Specification Binder package from which you want to remove a specification.
3. Select **Specification Sheets**.
4. Click **Actions > Remove All**.

NOTES

- You can choose whether SmartPlant Instrumentation keeps or deletes revisions that you saved while the specification was part of the Specification Binder package. For details, see Document Binder > General (Preferences).
- On removing a specification, the way in which the specification list is updated depends on the following:
- If the specification was originally assigned prior to saving the last revision of the Specification Binder package, the instrument tag still appears in the specification list browser view, with the **Tag Number** column set to **Deleted**.
- If the specification was originally assigned after saving the last revision of the Specification Binder package, its tag does not appear in the specification list.

Delete a Binder Package

1. Remove any specifications from the binder package you want to delete.

TIP If all specifications with a particular form number are deleted, the form note associated with that form is automatically deleted.

2. Delete the binder package by doing one of the following:
 - Click **Actions > Delete**.
 - Right-click the binder package and from the shortcut menu select **Delete**.

Manage Association of External Files with a Binder Package

Associate External Files with a Binder Package

For all of the procedures, do the following to open the **Associated Documents** dialog box:

1. In the **Document Binder** window, select the binder package for which you want to manage external files.
2. Click **Actions > Associated Documents**.

From the **Associated Documents** dialog box, you can perform the following procedures:

Associate an External File With a Binder Package

1. In the **Associated Documents** dialog box, click **Associate**.
2. In the **Associate External Document** dialog box, navigate to the file, and click **Open**.
3. In the **Associated Documents** dialog box, under **Description**, type a short description for the associated file.

Open an External File That You Associated With a Binder Package

On the **Associated Documents** dialog box, select the file that you want to open, and click **Open**.

Dissociate an External File From a Binder Package

In the **Associated Documents** dialog box, select the file that you want to dissociate from the binder package, and then click **Dissociate**.

Display Binder Package Properties

You can display the properties of a particular binder package to show general details and a record of the revisions that were made.

1. Select the desired binder package.
2. Do one of the following:
 - Click **Actions > Properties**.
 - Right-click the binder package and from the shortcut menu select **Properties**.
3. On the **Binder Package Properties** dialog box, click the **General** tab to show general details of the binder package.
4. Click the **Revisions** tab to show details of revisions made to the binder package.
5. When done, click **Close**.

Specification Binder Package Revisions

You can revise a set of specifications and notes in a Specification Binder package (for example, before printing a request for quotation from a vendor). Once you assign a specification to a Specification Binder package you may only create revisions to that specification as part of the Specification Binder package from the Document Binder module.

IMPORTANT The software does not allow you to perform revisions for Specification Binder packages when working in an integrated environment (on the **Revisions** dialog box, the **OK**, **New**, and **Delete** commands are disabled).

In general, the software allows you to save a revision only for documents that you have changed and saved. You are also allowed to save a revision in the following situations:

- If a specification has been newly-assigned to the binder package or if you have modified a specification for which a revision was already generated in the binder package.
- If you manually modified the **Changed** status of a document from **No** to **Yes**. For details, see *Modify the Change Notification of a Specification* (on page 336).
- If you removed an instrument specification from a Specification Binder package.

On creating a new revision for a Specification Binder package, documents in the binder package (Specification List, Form Notes, General Notes, and Change Summary report) are revised automatically, provided a change notification is set for at least one specification. Other document revisions are displayed in the title block of a printed version of these documents.

NOTES

- To be able to generate revisions, a Specification Binder package must have at least one specification assigned to it (if the binder package contains only general notes, for example, you cannot generate a revision for it).
- You cannot delete or rename a Specification Binder package once a revision has been performed on it.
- Before performing a revision in the Document Binder module, verify that none of the designated documents are open for editing in any other SmartPlant Instrumentation modules.
- When you perform a revision on a Specification Binder package, the specifications it contains may be assigned revision numbers that are actually lower than the number of any revisions that were performed for the individual specifications before they were assigned to the binder package.
- The software does not include in the Document Binder module revisions or documents that you created from the **Properties** dialog box for an item, for example, in the **Terminal Strip Properties** dialog box.
- You can set the preferences to allow for independent viewing of specification revisions made before and after incorporation into a Specification Binder package. For details, see Document Binder > Specification Binder (Preferences).
- Before saving a revision, you must first release all instrument tags associated with the designated specifications from any workflow assignments. If the System Administrator selected to implement a workflow option, one of the following conditions applies:
 - If **Full** was selected (which includes workflow for the Document Binder module), all the specifications in the Specification Binder package must have the status **Release to Spec**.
 - If **Without Document Binder** was selected, only those specifications in the Specification Binder package whose status is **PD not required** or **Locked from PD** can be revised.

Change Summary Report

The change summary report allows you to view all the changes that were made to binder packages since the last time a revision was made. To generate such a report, you double-click the **Change Summary Report** folder in the left area of the main Document Binder window. The report shows a list of the instrument tags that were modified and are associated with the specifications in the selected binder packages. For example, in the case of a multi-tag specification, a tag may have been added to the specification, or deleted from it.

If the tag data was modified, the report will display the following:

- Tag number
- The column where the change was made
- The old and new values for the specific column
- The person who made the change
- The date of change

NOTES

- The Change Summary Report uses data stored in the Audit Trail repository, therefore to enable generation of this report, in the Administration module **Domain Definition** window, the Domain Administrator has to select the **Audit trail options** check box.
- If changes were made to the main page of a multi-tag spec, each item in the list will be displayed separately in the report, along with its changes.
- Before a revision is saved for the first time or if no changes were made to items in the binder package after a certain revision, a report will not be generated.
- On SQL Server, the **Note** sheet can accept up to 255 characters; on Oracle or Sybase Adaptive Server Anywhere, you can type up to 2000 characters.
- Non-English, special character ASCII code used in a note is not displayed correctly in print preview.

Enable Specification Changes Notification

When you edit a specification in the Specifications module after adding a revision, you can set whether to notify the changes in the Document Binder module.

When a notification of the changes to a specification is enabled:

- The revision number of the specification will be incremented the next time a revision is made to the Specification Binder package to which it is assigned.
- Changes to the specification appear in the Change Summary Report.

NOTE The Change Summary Report uses data stored in the Audit Trail repository. Therefore, to enable generation of this report, in the Administration module **Domain Definition** window, the Domain Administrator has to select the **Audit trail options** check box.

After a Specification Binder package has undergone a revision, the changes notification is removed (on the **Specification Change Notification** dialog box, **No** appears under the **Changed** column for all the specifications), and any documents associated with it (Specifications, Form Notes, and General Notes) are saved.

Following a revision in the Document Binder module, if you modify a specification in the Specifications module, when saving the changes, a prompt appears enabling you to decide whether to notify the changes in the Document Binder module (this prompt does not appear if the change is already notified for the specification).

The available options are:

- **Mark this item as changed** — When this option is selected, the change you made in the Specifications module will also be indicated in the Document Binder module. In the **Specification Change Notification** dialog box, the **Changed** column for the specification will display **Yes**. Consequently, the specification revision number will be updated the next time you revise the Specification Binder package to which it is assigned. If any change was made to the specification, the instrument tags associated with the specification will appear in the Change Summary Report.
- **Do not change existing notification** — When this option is selected, the change will not be notified in the Document Binder module. In the **Specification Change Notification** dialog box, the **Changed** column for the specification will display **No**. It is recommended that you select this option only when the change is minor and you do not want it to be included in the next saved revision.

Binder Package Revision Archive

When you create a new revision for a binder package in the Document Binder module, a view-only archive copy is made of the information contained in the **Specifications**, **Notes**, and **Change Summary Report**.

The revision archive data can be saved in the database or in a file, depending on the setting that the Domain Administrator selects in the Administration module.

Revisions Common Tasks

The following tasks are used when you make revisions to documents in the Document Binder module.

Add a Revision to a Binder Package

This option shows you how to revise the documents in a binder package. There are a number of conditions restricting adding a new revision. For details, see *Specification Binder Package Revisions* (on page 331).

For more information, see *Add a Revision to a Binder Package* (on page 334).

Delete a Revision From a Binder Package

This procedure shows you how to delete revisions from a given binder package.

For more information, see *Delete a Revision From a Binder Package* (on page 335).

Convert Binder Package Revisions to .Zip Format Files

This procedure describes how to remove binder package revisions from the database into .zip format files.

When you save revisions to the database, the software compresses the data automatically to save space. To further streamline your database, you can also remove specification, binder package, and construction revisions from the database by converting them to .psr or .psr-within-.zip format files, which you save in folders external to the database. This feature is useful when you have made a large number of revisions, and want to reduce the size of the active and backup databases.

For more information, see *Convert Binder Package Revisions to .Zip Format Files* (on page 335).

Modify the Change Notification of a Specification

This procedure shows you how to modify the change notation of specifications in a Specification Binder package.

For more information, see *Modify the Change Notification of a Specification* (on page 336).

Add a Revision to a Binder Package

IMPORTANT The software does not allow you to perform revisions for Specification Binder packages when working in an integrated environment (on the **Revisions** dialog box, the **OK**, **New**, and **Delete** commands are disabled).

1. Select the desired binder package.
2. Do one of the following:
 - Click **Actions > Revisions**.
 - Right-click and from the shortcut menu select **Revisions**.
3. On the **Revisions** dialog box, select one of the revision numbering methods (use **P0**, **P1**, **P2...** for preliminary revisions or **0**, **1**, **2 / A**, **B**, **C**, and so forth for normal serial revisions).

TIPS

- When you first select a revision numbering method, several options are available to you, including preliminary revisions (designated by **P0**, **P1**, **P2...**). Once you select one of the other revision methods, you will not be able to return to the preliminary revision method and this option will be disabled.
 - Only the last five revisions appear in the **Revisions** dialog box.
4. Click **New** to add new revision data.
 5. Add the revision data in the appropriate data fields.
- TIP** The **By** field contains the current user's initials by default, if previously defined by the SmartPlant Instrumentation System Administrator. You can also edit this field. Today's date appears in the **Revision Date** field, by default, but you can change it if desired.
6. Click **OK** to save the revision and close the dialog box.

TIP After the revision is saved, the change notifications for all the specs are set to **No**. In the browser view, the **Tag Status** column for instrument tags associated with specs assigned to or deleted from the binder package prior to the last revision is cleared.

NOTES

- An instrument specification that is added to a Specification Binder package becomes a part of that package and is revised according to the new Specification Binder package revision number, and not the previous revision number that applied to the individual instrument specification.
- If you add a document to a General Document Binder package, and a revision is made for the package as a whole, you can still add revisions for the individual drawings in the package without any relation to the revision number of the package.

Delete a Revision From a Binder Package

IMPORTANT The software does not allow you to perform revisions for Specification Binder packages when working in an integrated environment (on the **Revisions** dialog box, the **OK**, **New**, and **Delete** commands are disabled).

1. In the **Document Binder** window, highlight the binder package from which you want to delete a revision.
2. Do one of the following:
 - Click **Actions > Revisions**.
 - Click .
3. On the **Revisions** dialog box, select the revision you want to delete, and click **Delete**.

TIP Repeat steps 1 - 3 for each revision that you want to delete.

4. Confirm the deletion by clicking **Yes**.

NOTE You can set the module preferences for automatic deletion of revisions when removing a specification from a binder package (for details, see Document Binder > General (Preferences).)

Convert Binder Package Revisions to .Zip Format Files

1. Click **Actions > Manage Revisions**.
2. To display binder packages of one revision only, under **Revisions filter**, type the revision number and click **Apply**.
3. Do one of the following:
 - In the data window, select the revisions that you want to convert.
 - To select all of the displayed revisions for conversion, click **Select all**.
4. Under **Convert revisions to**, click **ZIP files**.

TIPS

- To convert revisions to uncompressed .psr format, click **PSR files**.
- To restore .psr or .zip format files to the database, click **Database**.

5. Click **Convert**.

NOTES

- The Domain Administrator sets the default revision storage method in the Administration module. This gives you the option of storing binder package revisions directly to .zip files external to the database.
- You can vary this procedure to convert binder package revisions back-and-forth among .psr, .zip, and SmartPlant Instrumentation database format.

Modify the Change Notification of a Specification

1. Select a Specification Binder package.
2. Click **Actions > Spec Change Notification**.
3. On the **Specification Change Notification** dialog box, for the desired specifications, select the desired option in the **Changed** column:
 - **Yes** — Notify that the specification has changed.
 - **No** — Notify that the specification has not changed.

TIP Where **Yes** is selected, the specification is revised when the Specification Binder package is next revised. You can view the changes in the Change Summary Report.

Print and Save Options (Binder Package)

When printing documents from a binder package, you can choose between printing current documents or previous revisions, and then specify what to print:

- All the specifications and associated documents of the binder package
- Changed documents only
- Only the documents that you select

Printing from a Binder Package Common Tasks

The following tasks are used when you print document from a Document Binder.

Print Documents in a Binder Package

This procedure shows you how to print documents in a binder package.

For more information, see *Print Documents in a Binder Package* (on page 337).

Print From a Binder Package to a PDF File

This procedure shows you how to print a set of documents in a binder package as .pdf files. After setting the path and file name, choose between current documents and previous revisions, then specify what to print:

- All the specifications and associated documents of the binder package
- Changed documents only
- Only the documents that you select

All the documents are saved together in a single .pdf file. When you open the file — in Adobe® Reader for example — you can navigate easily from one document to the next.

For more information, see *Print From a Binder Package to a PDF File* (on page 337).

Save From a Binder Package to a .Zip File

This procedure shows you how to save a set of documents from a binder package to a .zip (compressed) file. The documents within the .zip file are in the .psr format that the software uses for saving reports.

After setting the path and file name, choose between current documents and previous revisions, then specify what to save:

- All the specifications and associated documents of the binder package

- Changed documents only
- Only the documents that you select

For more information, see *Save From a Binder Package to a .Zip File*. (see "Save From a Binder Package to a .Zip File" on page 338)

Print Documents in a Binder Package

1. Select the binder package for which you want to print documents.
2. Do one of the following:
 - Click **Actions > Print**.
 - Right-click the binder package and from the shortcut menu select **Print**.
3. On the **Print** dialog box, under **Select revision**, do one of the following:
 - Click **Working issue** for current files.
 - For a previous revision, click **Formal issue** and select the desired revision from the **Revision** list.
4. Under **Print what**, do one of the following:
 - Click **All documents in binder package** to print all the documents of the revision you selected, or of the working issue.
 - Click **Changed documents only** to print documents associated with specifications marked as changed since the previous revision. This option is available only if you selected **Working issue** above.
 - Click **Selected documents** to print the specifications and notes of your choice from the revision you selected, or from the working issue.
5. Select **Show print preview** to view the documents prior to printing.
6. Click **OK**.
7. If you clicked **Selected documents**, the **Select Documents** dialog box opens. Highlight the documents that you want to print and click **OK**.

NOTES

- Your Specifications module preferences also determine preferences for specifications that you print within binder packages. For more information, see Document Binder > General (Preferences).
- You can set font and color for report comparison. For more information, see *Setting Font and Color for Report Comparison* (see "Set Font and Color for Report Comparison" on page 52).

Print From a Binder Package to a PDF File

1. Select the binder package for which you want to print documents to a file.
2. Click **Actions > Print to File**.
3. On the **Print to File** dialog box, do one of the following:
 - Accept the file path displayed under **Path**. In this case, the software will create a unique file name in the currently displayed folder.
 - Click  and navigate to the folder where you want the software to save your .pdf files. After selecting this folder, you have the following **File name** options:
 - Type a file name.
 - Select an existing file name from the current folder.

NOTE You will be asked whether or not to overwrite the file. If you click **No**, the **Print to File** browse dialog box will reopen, and a number suffix will be added to the file name. You can edit the new file name and click **Save** to proceed,

- Leave the **File name** box blank to let the software create a unique file name.
4. On the **Print to File** dialog box, under **Select revision**, do one of the following:
 - Click **Working issue** for current files.
 - For a previous revision, click **Formal issue** and select the desired revision from the **Revision name** list.
 5. Under **Print what**, do one of the following:
 - Click **All documents in binder package** to print to file all the documents of the revision you selected, or of the working issue.
 - Click **Changed documents only** to print to file documents associated with specifications marked as changed since the previous revision. This option is available only if you selected **Working issue** above.
 - Click **Selected documents** to print to file the specifications and notes of your choice from the revision you selected, or from the working issue.
 6. Click **OK** to print the documents to a .pdf file.
 7. If you clicked **Selected documents**, the **Select Documents** dialog box opens. Highlight the documents that you want to print and click **OK**.

Save From a Binder Package to a .Zip File

1. Select the binder package for which you want to save documents into a .zip file.
2. Click **Actions > Save to File**.
3. On the **Save to File** dialog box, do one of the following:
 - Accept the file path displayed under **Path**. In this case, the software will create a unique file name in the currently displayed folder.
 - Click  to open the **Save As** dialog box. Navigate to the folder where you want the software to save your .zip files. After selecting this folder, you have the following **File name** options:
 - Type a file name.
 - Select an existing file name from the current folder.
 - Leave the **File name** box blank for the software to create a unique file name.
 - Click **Save** to return to the **Save to File** dialog box.
4. Under **Select revision**, do one of the following:
 - Click **Working issue** for current files.
 - For a previous revision, click **Formal issue** and select the desired revision from the **Revision name** list.
5. Under **Save what**, do one of the following:
 - Click **All documents in binder package** to save all the documents of the revision you selected, or of the working issue.
 - Click **Changed documents only** to save documents associated with specifications marked as changed since the previous revision. This option is available only if you selected **Working issue** above.

- Click **Selected documents** to save the specifications and notes of your choice from the revision you selected, or from the working issue.
- 6. Click **OK** to save the documents into a .zip file.
- 7. If you clicked **Selected documents**, the **Select Documents** dialog box opens. Highlight the documents that you want to save and click **OK**.

Document Binder Module Troubleshooting

Errors may occur when you are working in the Document Binder module. This section describes the common ones, with recommendations for solving the problems.

Binder package problems

Problem Description	Suggested Reason	Recommended Solution
Cannot rename the binder package	Binder package has already undergone a revision.	
Cannot delete the binder package	Binder package has already undergone a revision or if not, it still has specs assigned to it.	If binder package has not yet undergone a revision, remove all the specifications from the binder package.
When selecting detailed view of specification list, a message appears: "Failed to retrieve Style Setting."	Default View deleted or not defined in Document Binder Browser.	Create a View in the Package Browser and define a style for it. Ensure that the Set as default view check box is selected.
No forms available for selection when you try to add a note to the Form Notes folder	No specification has been assigned to the binder package.	

Revision problems

Problem Description	Suggested Reason	Recommended Solution
Cannot revise the binder package	One or more of the documents in the binder package are being edited.	Close the edit location (specification or note editor).

	One or more of the instrument tags associated with the specification are locked for process data.	Release all instrument tags from any workflow assignments.
Cannot save revised documents	Target is not defined for the revision.	Your Domain Administrator needs to define the path or location.

Printing problems

Problem Description	Suggested Reason	Recommended Solution
Cannot prepare pages for printing	Open specifications or notes.	Close all specifications and notes, then re-select the print option.
The binder package includes blank reports	One or more of the documents in the binder package is missing.	Search for the missing reports according to the names displayed in the error messages, and move them to the appropriate document location.
Cannot print binder package	Binder package contains no documents.	Assign a spec to the binder package, or add a General Note.
Cannot repaginate before printing	A problem exists with the specification, the form, or the format.	Open the specification in the Specifications module and follow the instructions.

Claiming As-Built Items for a Project

In an owner operator domain, when working in a project with As-Built items displayed, you can claim As-Built items for this project directly in SmartPlant Instrumentation. It is possible to claim As-Built items using one of the following modes: exclusive claim mode or non-exclusive claim mode. The System Administrator sets the claim mode when making domain definitions in the Administration module. After a Project Administrator creates the first project in the domain, the claim mode becomes set permanently for the current domain until the Project Administrator deletes all of the projects.

Claiming items is the final stage of defining the project scope. Before claiming items, you can copy them to the **Claim Buffer**, which is only available in the Administration module. Then, your Project Administrator can log on to the Administration module and claim the copied items for the project in batch mode. Alternatively any user with full **Project Definition** access rights can claim the copied items using command line parameters.

Any SmartPlant Instrumentation user can copy any number of items to the **Claim Buffer**, however, only users with full **Claim Items for Project** access rights can claim As-Built items directly from the project opened in SmartPlant Instrumentation, without copying them to the **Claim Buffer** first, provided that the **Claim Buffer** is empty. Performing a batch claim of As-Built items directly from the project is not possible. You can only claim a specific item that you select, with or without its child items, according to the preferences.

When using non-exclusive claim mode, in SmartPlant Instrumentation, it is only possible to claim items from As-Built. If you want to claim items from one project to another, you must use the Administration module options.

When the As-Built item used as a source for claiming has child items, you can set preferences to include or exclude the child items when claiming the parent item. For example, you can claim a cable with or without its associated cable sets or wires. It is also possible to reclaim the same item to update the item properties with the As-Built item properties. For details about the preferences for claiming, see *Claim and Merge Options (Preferences)* (on page 25).

In a project, claiming options are available in the Instrument Index module, Browser module, and the **Domain Explorer**:

- In the Instrument Index module, you can select instruments and claim them with the engineering data defined in other modules, for example, with the associated hook-ups.
- In the Browser module, you can select instruments, lines, loop numbers, or equipment data for claiming.
- In the **Domain Explorer**, you can select any item and copy it to the **Claim Buffer** for further processing by your Project Administrator, or claim the items according to the preferences set on the **Claim and Merge Options** page of the **Preferences** dialog box. Note, however, that if you want to claim fieldbus tags, you only need to claim the associated fieldbus segments with their sub-items and the fieldbus tags are claimed automatically.

IMPORTANT It is recommended that any cables in the As-Built, that have been assigned to cable drums, are un-assigned from their drums before you claim them to the project. Failure to do so, will result in inconsistencies in the As-Built drum data when merging the cables back to the As-Built.

Preparing Project Items for Merging with As-Built

In a project opened in an owner operator domain, in the **Domain Explorer**, you can select items you want to merge with As-Built and copy them to the **Merge Buffer** for further processing from the Administration module or for merging the copied items using command line parameters. The **Merge Buffer** is only accessible from the Administration module. It is not possible to merge items directly from a project.

Before you copy items to the **Merge Buffer**, you can set preferences to include or exclude the child items when copying the parent item. For example, you can copy a cable with or without its associated cable sets or wires. For details about the preferences for copying items to the **Merge Buffer**, see *Claim and Merge Options (Preferences)* (on page 25).

When copying items to the **Merge Buffer**, you select a merge action for all or selected items. At this stage, the software applies the merge action to the items and also applies the preferences options that you have set. The following actions are available per item:

Merge now — Overwrites the data in As-Built with the modified data in the current project. The results depend on the change made in the project:

- Items that SmartPlant Instrumentation users created in the project are also inserted in As-Built. If an item that exists in the project was deleted in As-Built, that item is reinserted in As-Built.
- Items that SmartPlant Instrumentation users deleted in the project are also deleted in As-Built.
- Items that SmartPlant Instrumentation users updated in the project are also updated in As-Built. Also, if you made any changes to As-Built data after claiming the item for the project, the software overwrites the As-Built data with the project data on merging.

Release claim — Disregards changes and leaves the data in As-Built as it was before claiming it for the project. When using the Release Claim action, the following rules apply to project data:

- The Release Claim action does not apply to new items that you create in the project.
- The Release Claim action does not apply to new sub-items you associated with a claimed item.
- If a claimed item does not have new sub-items you created in the project, the software removes the claimed item from the project even if you changed its name and description in the project.
- If a claimed item has new sub-items you created in the project, the software always leaves this claimed item as a dummy item in the project.
- If a claimed item has both claimed sub-items and new sub-items you created in the project, the software only removes the claimed sub-items from the project. The parent item appears in the project as a dummy item.

NOTES

- Your Project Administrator can merge items using one of the two modes set by System Administrator for the current domain: with deletion from the project or without deletion from the project. Depending on the merge mode, on merging data, the software either deletes the merged items from the project or leaves view-only copies of the merged items in the project. You cannot delete these copies or update their properties. It is possible, however, to claim these items for another project even if you are working in exclusive claim mode.
- If you want to merge fieldbus tags, you only need to copy to the **Merge Buffer** the associated fieldbus segments with their sub-items. It is not possible to merge fieldbus tags manually.

See Also

Display As-Built and Project Data (on page 343)

Claiming and Merging Items Common Tasks

In an owner operator domain, the following tasks are used frequently when you claim or copy to the **Claim Buffer** items directly from a project opened in SmartPlant Instrumentation. Also, it is possible to prepare project data for merging with As-Built by copying project items to the **Merge Buffer**. After copying items to the **Merge Buffer**, your Project Administrator can either use the Administration module options to merge the items, or merge the items from the command line. The **Claim Buffer** and **Merge Buffer** are only accessible from the Administration module.

Display As-Built and Project Data

If you open a project in an owner operator domain, you can either choose to display only the project items, or project items together with view-only As-Built items, which you can claim for the project. It is only possible to claim items if you open a project together with As-Built items displayed. For details, see *Display As-Built and Project Data* (on page 343).

Copy As-Built Items to the Claim Buffer

This procedure allows you to copy items from the SmartPlant Instrumentation Domain Explorer to the **Claim Buffer**, which is only accessible from the Administration module. After you copy the items, the Project Administrator can log on to the Administration module and claim all or specific the items that you copied in the **Claim Buffer**. When you select items, the software automatically applies preferences that you set on the **Preferences** dialog box. These preferences determine how the software copies to the **Claim Buffer** sub-items that are associated with the items you select. For more information, see *Copy As-Built Items to the Claim Buffer* (on page 344).

Claim As-Built Items from the Domain Explorer

If the **Claim Buffer** does not contain any items, you can use this procedure to claim items directly from the **Domain Explorer**. When you select items, the software automatically applies preferences that you set on the **Preferences** dialog box. These preferences determine how the software claims sub-items that are associated with the items you select. For more information, see *Claim As-Built Items from the Domain Explorer* (on page 345).

Claim Instruments in the Browser or Instrument Index Module

You can claim tag numbers in the Instrument Index module, or in the Browser module. In an owner operator domain, use this procedure to claim the As-Built tags for the current project, with or without the engineering data associated with the tags. For more information, see *Claim Instruments in the Browser or Instrument Index Module* (on page 345).

Claim Loops, Lines, and Equipment in the Browser Module

This procedure describes how to claim As-Built loops, lines, and equipment in the Browser module. The software claims items without any engineering data that is associated with the items. For example, when claiming a loop, the software does not claim the tag numbers associated with the loop. For more information, see *Claim Loops, Lines, and Equipment in the Browser Module* (on page 346).

Copy Items to the Merge Buffer as Merge Now

Use this procedure to copy specific items from the **Domain Explorer** to the **Merge Buffer** and assign a Merge Now action to these items. For more information, see *Copy Items to the Merge Buffer as Merge Now* (on page 346).

Copy Items to the Merge Buffer as Release Claim

Use this procedure to copy specific items from the **Domain Explorer** to the **Merge Buffer** and assign a Release Claim action to these items. For more information, see *Copy Items to the Merge Buffer as Release Claim* (on page 347).

Display As-Built and Project Data

1. On the **Open** dialog box, select a domain of type **Owner operator**.
2. Double-click the appropriate project icon  to select the project you want to work with (As-Built or a project).
 - To view As-Built data only, select As-Built from the list.
 - To view project data, select any project from the list (you can choose afterwards whether to display As-Built data with the project data - see steps 4 and 5 for details).
3. Select the <unit> in which you want to work and click **OK**. By default, SmartPlant Instrumentation opens with data visible only from the project you selected.

4. To display As-Built and project data together, do one of the following:
 - Click .
 - Click **File > As-Built Data**.
5. To return to the display of project data only, do one of the following:
 - Click .
 - Click **File > Project Data**.

NOTES

- According to the data you select to display, the items will be formatted according to the settings made in the Administration module.
- If you select to display both project and As-Built data, you can edit the project data only.
- When working in a project with As-Built items displayed, As-Built items are view-only. In the **Domain Explorer**, you can select an As-Built item and display its properties. As-Built items are indicated with the  icon.

Copy As-Built Items to the Claim Buffer

1. Open a project together with the As-Built data displayed. For details, see *Display As-Built and Project Data* (see "Display As-Built and Project Data" on page 343).
2. Press F7 to open the **Domain Explorer**.
3. Expand the explorer hierarchy to display folders of item types.
4. In the tree view pane, click an item type folder to display the items.
5. Do one of the following:
 - In the tree view pane, right-click a specific item, and on the shortcut menu, click **Project Activities > Copy to Claim Buffer**.
 - In the **Items** pane, select and right-click one or more items, and on the shortcut menu, click **Project Activities > Copy to Claim Buffer**.

TIPS

- When you copy items to the **Claim Buffer**, in addition to the main items you select, the software can select the associated sub-items automatically, or you have the option to include the sub-items manually with the main item by setting preferences accordingly. For details, see *Claim and Merge Options (Preferences)* (on page 25).
- If you copied to the **Claim Buffer** a loop or instrument together with the wiring items, the software only copies those wiring items that have a signal propagated to the loop or instrument. If you placed a device panel inside a cabinet or junction box, when claiming the loop, this device panel is not copied together with the cabinet or junction box because this device panel does not have a signal propagated to the loop. You must select and copy such a device panel manually.

Claim As-Built Items from the Domain Explorer

NOTE Claiming items from the **Domain Explorer** is only possible if the **Claim Buffer** in the Administration module has no items.

1. Open a project together with the As-Built data displayed. For details, see *Display As-Built and Project Data* (see "Display As-Built and Project Data" on page 343).
2. Press F7 to open the **Domain Explorer**.
3. Expand the explorer hierarchy to display folders of item types.
4. In the tree view pane, click an item type folder to display the items.
5. Do one of the following:
 - In the tree view pane, right-click a specific item, and on the shortcut menu, click **Project Activities > Claim**.
 - In the **Items** pane, select and right-click one or more items, and on the shortcut menu, click **Project Activities > Claim**.

TIPS

- When claiming instruments from the **Domain Explorer**, you cannot select basic engineering data manually or set the software to claim instruments without including the associated basic engineering data. It is possible to claim instruments without the engineering data in the Browser or Instrument index module. For details, see *Claim Instruments in the Browser or Instrument Index Module* (on page 345).
- When you claim items, in addition to the main items you select, the software can select the associated sub-items automatically, or you have the option to include the sub-items manually with the main item by setting preferences accordingly. For details, see *Claim and Merge Options (Preferences)* (on page 25).
- If you claimed a loop or instrument together with the wiring items, the software only claims those wiring items that have a signal propagated to the loop or instrument. If you placed a device panel inside a cabinet or junction box, when claiming the loop, this device panel is not claimed together with the cabinet or junction box because this device panel does not have a signal propagated to the loop. You must select and claim such a device panel manually.

Claim Instruments in the Browser or Instrument Index Module

1. Open a project together with the As-Built data displayed. For details, see *Display As-Built and Project Data* (see "Display As-Built and Project Data" on page 343).
2. Do one of the following:
 - Open an Instrument Index Standard Browser view.
 - In the Browser module, open a browser view for the Instrument Index browser.
3. Select and right-click the As-Built tag numbers that you want to claim for the current project.

TIP As-Built and project tag numbers have different color coding. The Project Administrator selects which colors to use on the **Project Activities** dialog box in the Administration module.
4. On the shortcut menu, click **Claim**.
5. In the **Tag Claiming Options** dialog box, select **Basic engineering data** to claim associated data that was defined for the tags in the Instrument Index, Calculation, Specifications, Hook-Ups, Process Data, and Dimensional Data for Piping modules.

6. Select **Wiring data** to claim associated wiring data that was defined for the tags in the Wiring module.

TIP It is possible to claim instruments either without the engineering data or without the wiring data. You must select at least one check box.

Claim Loops, Lines, and Equipment in the Browser Module

1. Open a project together with the As-Built data displayed. For details, see *Display As- Built and Project Data* (see "Display As-Built and Project Data" on page 343).
2. In the Browser module, expand the Instrument Index browser group and open a browser view for one of the following browsers:
 - Loop Browser.
 - Line Browser.
 - Equipment Browser.
3. Select and right-click the As-Built items that you want to claim for the current project.

TIPS

- As-Built and project items have different color coding. The Project Administrator selects which colors to use on the **Project Activities** dialog box in the Administration module.
 - In the Browser module, you can also claim instrument tag numbers. For details, see *Claim Instruments in the Browser or Instrument Index Module* (on page 345).
4. On the shortcut menu, click **Claim**.

Copy Items to the Merge Buffer as Merge Now

1. Open a project together with the As-Built data displayed. For details, see *Display As- Built and Project Data* (see "Display As-Built and Project Data" on page 343).
2. Press F7 to open the **Domain Explorer**.
3. Expand the explorer hierarchy to display folders of item types.
4. In the tree view pane, click an item type folder to display the items.
5. Do one of the following:
 - In the tree view pane, right-click a specific item, and on the shortcut menu, click **Project Activities > Copy to Buffer as Merge Now**.
 - In the **Items** pane, select and right-click one or more items, and on the shortcut menu, click **Project Activities > Copy to Buffer as Merge Now**.

TIPS

- If the items that you select already appear in the **Merge Buffer**, when copying the items, the software also changes the merge action to Merge Now for those items.
- When you copy items to the **Merge Buffer**, in addition to the main items you select, the software can select the associated sub- items automatically, or you have the option to include the sub-items manually with the main item by setting preferences accordingly. For details, see *Claim and Merge Options (Preferences)* (on page 25).

- If you copied to the **Merge Buffer** a loop or instrument together with the wiring items, the software only copies those wiring items that have a signal propagated to the loop or instrument. If you placed a device panel inside a cabinet or junction box, when merging the loop, this device panel is not copied together with the cabinet or junction box because this device panel does not have a signal propagated to the loop. You must select and copy such a device panel manually.

Copy Items to the Merge Buffer as Release Claim

1. Open a project together with the As-Built data displayed. For details, see *Display As-Built and Project Data* (see "Display As-Built and Project Data" on page 343).
2. Press F7 to open the **Domain Explorer**.
3. Expand the explorer hierarchy to display folders of item types.
4. In the tree view pane, click an item type folder to display the items.
5. Do one of the following:
 - In the tree view pane, right-click a specific item, and on the shortcut menu, click **Project Activities > Copy to Buffer as Release Claim**.
 - In the **Items** pane, select and right-click one or more items, and on the shortcut menu, click **Project Activities > Copy to Buffer as Release Claim**.

TIPS

- If the items that you select already appear in the **Merge Buffer**, when copying the items, the software also changes the merge action to Release Claim for those items.
- When you copy items to the **Merge Buffer**, in addition to the main items you select, the software can select the associated sub-items automatically, or you have the option to include the sub-items manually with the main item by setting preferences accordingly. For details, see *Claim and Merge Options (Preferences)* (on page 25).
- If you copied to the **Merge Buffer** a loop or instrument together with the wiring items, the software only copies those wiring items that have a signal propagated to the loop or instrument. If you placed a device panel inside a cabinet or junction box, when merging the loop, this device panel is not copied together with the cabinet or junction box because this device panel does not have a signal propagated to the loop. You must select and copy such a device panel manually.

Working with Cable Routing in Projects

There are a number of scenarios that influence the way you work with cable routing in As-Built and Projects. The actual procedures are the same as for working in an EPC plant. For more information on cable routing, see Cable Routing.

These scenarios are based on an As-Built plant with at least 2 projects.

IMPORTANT It is recommended that any cables in the As-Built, that have been assigned to cable drums, are un-assigned from their drums before you claim them to the project. Failure to do so, will result in inconsistencies in the As-Built drum data when merging the cables back to the As-Built.

Scenario 1

The As-Built has no routing data

When the **As-Built** contains no cables with routing data, you can add routing data to one of the plants projects. When you have finished adding the routing data to your project you must merge cables with the routing data back to the plant. If you want to work with the routing data in another project you must claim it from the As-Built after it has been merged back to the As-Built.

IMPORTANT Routing data can only be added to one project at a time. To add routing data to another project, the cables with the routing data must be merged with the plant and then claimed by another project.

Scenario 2

The As-Built has routing data.

When the **As-Built** has cables with routing data, the first project that these cables are claimed to, becomes the project that you can add and edit routing data in. Only one project at a time can claim routing data, claiming cables with routing data, to a second project, does not allow you working access to the routing data. If you want to work with the routing data in another project you must claim it from the As-Built after it has been merged back to the As-Built.

IMPORTANT Though the routing data is only available for working with, from within one project, both the reports and validations collate all the routing data from the plant and all its projects, not just the project with the working access to the routing data.

SECTION 33

Working with Interfaces

SmartPlant Instrumentation provides several interfaces that allow you to exchange data with the following products:

- *SmartPlant Electrical* (see "*SmartPlant Electrical Interface*" on page 350)
- * *SmartPlant P&ID* (see "*SmartPlant P&ID Interface*" on page 359)
- * *PDS* (see "*PDS Interface*" on page 370)
- * *FirstVue* (see "*FirstVue Interface*" on page 397)
- * *Masoneilan ValSpeQ* (see "*Masoneilan ValSpeQ Interface*" on page 405)
- * *Flowserve Performance!* (see "*Flowserve Performance! Interface*" on page 411)
- *DCS Vendor Interfaces* (on page 377):
 - DeltaV
 - Yokogawa CENTUM CS 3000
 - ABB
 - Honeywell

NOTE For the systems marked with an asterisk(*), the import procedure must be carried out using the predefined import links for the interface. To make the links available, you need to import the appropriate system interfaces into SmartPlant Instrumentation from the Administration module.

Import System Interfaces

1. Start the Administration module and log on as Domain Administrator.
2. With the **Domain Administration** window open, click **Add-Ins > Import System Interfaces**.
3. Under **Source database**, locate the database file in one of the following ways:
 - In the **File name and path** box, type the path and filename of the database file In_ctlog.db.
 - Click **Browse** to navigate to In_ctlog.db.
4. Click **Connect** to connect to the source database file.

IMPORTANT If you get a message stating that the connection has failed, make sure you typed in the correct path and filename of the database file (see step 3 of this procedure).
5. Under the **Select link group** section, select one or more of the link groups to import.
6. Locate the source path of all the links in the imported group in one of the following ways:
 - In the **Source file path** data field, type the source path.
 - Click **Browse** to navigate to the required source path.
7. Clear the **Import only source codes** check box if it was selected.
8. If you are importing the **PDS/SmartPlant P&ID link**, select or clear the **Import typical instruments** check box as desired.
9. Click **Import** to add the selected link group to the database.

SmartPlant Electrical Interface

The SmartPlant Electrical Interface allows you to exchange data between the two applications using the following document types:

- **Power elements** — You initially define power supply requirements in SmartPlant Instrumentation for tag numbers and for any panel type except for junction boxes and device panels. On publishing the data from SmartPlant Instrumentation, SmartPlant Electrical uses the published power supply data to create instruments from SmartPlant Instrumentation tag number data and cabinets from panel data in SmartPlant Instrumentation. You can then publish the data and retrieve it back to SmartPlant Instrumentation with SmartPlant Electrical PDB information.
- **Signals** — Signal data can originate in SmartPlant Electrical or in SmartPlant Instrumentation. You can define signal data for generators, battery banks, converting equipment, loads, control stations, any type of circuit, and disconnect equipment. On retrieving all SmartPlant Electrical signals, SmartPlant Instrumentation creates special electrical tags, for which you can perform wiring and I/O control system tag assignments. After the wiring is complete, you can publish the data back to SmartPlant Electrical for further processing, and use it to display PLC or other host I/O data in SmartPlant Electrical schematics.

NOTES

- The documents published by the two applications do not contain the same properties. For example, instrument and cabinet data includes power supply parameters such as rated voltage, full load current, and so forth, which originate in SmartPlant Instrumentation. However, SmartPlant Electrical only publishes PDB/Cell/Circuit information. Similarly, SmartPlant Instrumentation publishes host data for signals that originate in SmartPlant Electrical, but SmartPlant Electrical does not publish the host data back to SmartPlant Instrumentation. For this reason, if, in SmartPlant Electrical, you change data values that originated from SmartPlant Instrumentation, you should update those values accordingly in SmartPlant Instrumentation, and vice versa.
- If you publish signals in SmartPlant Electrical for circuits that feed items other than loads, converting equipment, generators, battery banks, instruments, or cabinets, then on retrieving the items in SmartPlant Instrumentation and running the tasks, SmartPlant Instrumentation does not display the associated items.

Prerequisites for Working with the SmartPlant Electrical Interface

Before you can work with the SmartPlant Electrical Interface, you must perform the following actions:

1. Install the SmartPlant Schema Component from the SmartPlant Instrumentation CD Browser (click **Add-In Software**, and then click **Schema Component Installation**).

TIP On the **Select Optional Features** page, clear the **Schema Editor** check box if you do not need to use the Schema Editor.

2. Install the SmartPlant Client from the SmartPlant Instrumentation CD Browser (click **Add-In Software**, and then click **SmartPlant Client Installation**).

TIP On the **Select Features** page, make sure that you clear the **SmartPlant Automatic Retrieval** check box.

3. In the Windows Registry, you need to specify the folder location of the .xml file containing the published data. In the case where multiple users publish the data, all the users must define the same path. The path is defined in the Registry location `HKEY_CURRENT_USER\Software\INTERGRAPH\INTOOLS` using the parameter `OutputXMLFolder = <.xml file path>`.
4. The System Administrator must enable the item registry. For details, see *Enable Item Registry* in the Administration User's Guide, under System Administration, Domain Management.
5. The Domain Administrator must register the items. For details, see *Register Items* in the Administration User's Guide, under Working in an Integrated Environment.
6. Set up the plant hierarchy for which you are going to publish and retrieve data.

TIPS

- To ensure the smooth functioning of the SmartPlant Instrumentation backup and restore functions and to avoid duplicating data, each plant in SmartPlant Electrical must map to SmartPlant Instrumentation at the **domain** level. For this reason, make sure that each SmartPlant Instrumentation domain that you map contains no more than one plant.
 - At this stage, the prerequisites for working with the interface must also be met on the SmartPlant Electrical side. For details, refer to the SmartPlant Electrical Online Help topic: *Prerequisites for Working with the SmartPlant Instrumentation Interface*.
7. In SmartPlant Instrumentation, retrieve the file `Plant Groups.xml`, (on the **SmartPlant** menu, click **Retrieve**, and then navigate to the file which is published in the folder of the current specified SmartPlant Electrical plant). This file contains plant structure information to facilitate correlation of the plant structures between both applications.
 8. For each unit where data is to be published and retrieved, the Domain Administrator must open the **Unit** dialog box and enter a unit number corresponding to the unit code of the mapped SmartPlant Electrical unit.
 9. You are now ready to use the interface to publish and retrieve data.

Flow of Activities for Creating Control Systems

The following steps constitute the primary flow of activities when you use SmartPlant Instrumentation to create the detailed wiring and control system data for a SmartPlant Electrical item:

1. In SmartPlant Electrical, create signals for the items you want to associate with control systems in SmartPlant Instrumentation and publish the data from SmartPlant Electrical. For details, refer to *SmartPlant Electrical Online Help*.

TIP

SmartPlant Electrical publishes the data in an .xml file, which it creates in the plant structure path.

2. Open SmartPlant Instrumentation and retrieve the data that originated in SmartPlant Electrical. For details, see *Retrieve SmartPlant Electrical Data* (on page 353).
3. Run the tasks that the software generates as a result of the retrieve. For details, see *Run Tasks from the To Do List* (on page 504).

TIPS

- SmartPlant Instrumentation automatically creates tag numbers from the retrieved data and identifies them as SmartPlant Electrical tags.
- As an alternative to creating signals in SmartPlant Electrical and then publishing them, you can create the Electrical tags directly in SmartPlant Instrumentation. For details, see *Create Electrical Tags* (on page 353).

4. View the SmartPlant Electrical tags created in SmartPlant Instrumentation. For details, see *Viewing Electrical Tag Numbers* (on page 353).
5. Associate the SmartPlant Electrical tags with loop numbers where needed; the software populates the loop number data to SmartPlant Electrical later.
6. Associate the SmartPlant Electrical tags with electrical equipment where needed. For details, see *Associate Electrical Signals with Equipment* (on page 354).
7. Create the necessary panels and cables and make the connections needed to propagate the signal to the DCS or PLC that is used to define the control system tag relationship. For details, see *Create Wiring Items for SmartPlant Electrical Signals* (on page 355).

TIP If a signal is associated with a circuit in SmartPlant Electrical, it inherits its power distribution board (PDB) item tag as an associated field and is considered as a pre-assigned signal for the PDB cabinet. For circuit signals, SmartPlant Instrumentation automatically creates a cabinet with the name of the power distribution board to which the circuit was connected in SmartPlant Electrical. For other signals, you need to create device panels manually in SmartPlant Instrumentation. For details, see *Create a Local Signal for Electrical Tags* (on page 356).

8. Publish the data to SmartPlant Electrical. This creates an .xml document containing SmartPlant Instrumentation data such as the control system configuration, I/O assignment, PLC I/O card and channel, instrument tags, loop number, and so forth. For details, see *Publish Data for SmartPlant Electrical* (on page 358).

TIP The software creates the file in the path: <SmartPlant Instrumentation home folder>\XML\IO Assignment_data.xml.

9. Retrieve (import) the configured data in SmartPlant Electrical.
10. Display the I/O assignment data in a SmartPlant Electrical schematic by including in the schematic macros related to SmartPlant Electrical signal data. For details, see SmartPlant Instrumentation Macro Structure.

TIP In Enhanced Report Utility reports and CAD drawings for a signal that applies to a circuit, the loop macros cannot retrieve main or associated electrical equipment names and types because the signal is not directly linked with these items. Furthermore, it is possible for a circuit to feed more than one item of equipment, and this is incompatible with the way that macros function, where each macro can retrieve only a single data value at a time. Likewise, if a signal is linked to an item of electrical equipment, you cannot use macros to retrieve circuit data.

NOTES

- You can repeat this procedure as many times as you want to; SmartPlant Instrumentation recognizes new, modified, and deleted data that is published from SmartPlant Electrical.
- The data is owned by the application that created it. If you modify or delete the data in the application that does not own it, the next time you retrieve the data from the owner application, it overwrites any modified data, or reinserts data if it was deleted. A specific data property usually belongs to one or other of the applications; however, the **Sys I/O type** property is owned by both applications and in this case the software overwrites the value in whichever application you retrieve the data.

Retrieve SmartPlant Electrical Data

1. Click **SmartPlant> Retrieve**.
2. On the **Retrieve Document** dialog box, type the path to the folder where the source .xml files containing the published data are located, or click **Browse** to navigate to the folder.
3. From the **Document** list, select the document that you want to retrieve.
4. Run the tasks that the software generates as a result of the retrieve. For details, see *Run Tasks from the To Do List* (on page 504).

NOTES

- The software automatically retrieves the appropriate .xml files associated with the document that you select.
- It is possible for SmartPlant Electrical users to delete items that originated from SmartPlant Instrumentation, such as cabinets. In this case, when data is next published from SmartPlant Electrical and retrieved back into SmartPlant Instrumentation, the software creates **Delete** tasks for those items in the **To Do List** window. If you do not want those items to be deleted from the SmartPlant Instrumentation database, you should click  to remove the task from the **To Do List** window.

Create Electrical Tags

1. In the **Domain Explorer**, expand the plant hierarchy to display the **Electrical Tags** folder and right-click the folder.
2. On the **New Tag Number** dialog box, enter a tag number.
3. On the **Loop Name** dialog box, if desired, enter a loop number or click **Cancel** to skip loop creation.
4. On the **Tag Number Properties** dialog box, enter values as desired.

TIP Values that you enter for the **Service** and **I/O type** properties appear in the **Description** and **I/O type** fields respectively for the signal properties after the data is retrieved in SmartPlant Electrical.

See Also

Prerequisites for Working with the SmartPlant Electrical Interface (on page 350)

Viewing Electrical Tag Numbers

On retrieving data from SmartPlant Electrical, SmartPlant Instrumentation creates corresponding electrical tags. You can view these tags from the **Domain Explorer** or in the Browser module.

NOTES

- Some tag number properties apply to SmartPlant Electrical data only, and are read-only. You can edit other properties such as **Service**, **I/O type**, and **Notes**.
- When you retrieve a SmartPlant Electrical PDB (power distribution board) pre-assigned circuit signal, SmartPlant Instrumentation automatically creates a cabinet with the name of the power distribution board associated with the signal. If you delete such a cabinet, its pre-assignment relationship with the signal is lost and you will no longer be able to find the tag for that signal when you select **Pre-assigned signals only** in the **Signal Filter** dialog box. However, the next time you publish the signal from SmartPlant Electrical and retrieve it into SmartPlant Instrumentation, the cabinet is created afresh.
- When you download electrical tags from SmartPlant Electrical, after making the I/O assignments, SmartPlant Instrumentation automatically assigns a control system tag to each electrical tag.

- There are three categories of electrical signals, for each of which the user interface differs slightly, as follows:
 - Signals related directly to PDB circuits that are associated with main equipment; for example, a signal created in a feeder circuit that feeds a motor.
 - Signals directly related to main equipment; for example, a signal created under a motor or a transformer.
 - Signals associated directly with control stations that are associated with main equipment such as motors.
- In the **Domain Explorer**, electrical tag numbers can be viewed by expanding the **Electrical Tags** folder.
- In the Browser module, you can view electrical tag numbers from one of the following browsers:
 - **Electrical Tag Browser** — Displays data for all tag numbers derived from SmartPlant Electrical signals for all items but does not retrieve data values of associated attributes for signals created under circuits. The software displays data for the main item and also associated circuit data.
 - **Circuit Related Electrical Tag Browser** — Displays data for tag numbers derived from SmartPlant Electrical signals for circuits. If a circuit relates to more than one electrical item, a separate data row appears for each item.
 - **Electrical Power Element Browser** — Displays electrical properties owned by SmartPlant Instrumentation and SmartPlant Electrical for instruments and cabinets.

Associate Electrical Signals with Equipment

1. In the **Domain Explorer**, expand the **Electrical Equipment** folder hierarchy and select the desired item of electrical equipment from one of the following sub-folders:
 - **PDBs** — for Power Distribution Boards and their associated circuits.
 - **Main Equipment** — for items such as motors, heaters, control stations that are associated with electrical equipment, and so forth.
 - **Control Stations** — for control stations without associations with electrical equipment.

TIPS

- The items that appear in these folders are retrieved from SmartPlant Electrical; you cannot create them in SmartPlant Instrumentation.
 - To associate an electrical signal with an electrical equipment item, that item must not have any existing associations.
2. From the **Electrical Tags** folder, select an electrical signal tag and drag it to the desired item under the **Electrical Equipment** sub-folder.

TIP You can only associate electrical tag signals that do not have existing associations with electrical equipment.

See Also

Prerequisites for Working with the SmartPlant Electrical Interface (on page 350)

Create Wiring Items for SmartPlant Electrical Signals

1. If necessary, press **F7** to open the **Domain Explorer**.
2. Do one of the following:
 - Double-click the **Panels by Location** folder, right-click a location, and then on the shortcut menu, click **New > PLC Panel**.
 - Double-click the **Panels by Category** folder, right-click the **PLC Panels** folder, and then on the shortcut menu, click **New > PLC Panel**.
3. Create an I/O card for the PLC panel. For details, see [Create an I/O Card](#).

TIP When entering channel addresses for the I/O card, the values must be numeric only for publishing to SmartPlant Electrical.
4. Create the cables needed to make the connections.
5. Add terminal strips to the cabinets that SmartPlant Instrumentation created automatically from circuit signals that you downloaded from SmartPlant Electrical.
6. Create device panels for tags that do not come from pre-assigned signals. Such tags usually originate from SmartPlant Electrical control stations or from one of the types of electrical equipment (motors, heaters, transformers, generators, and so forth).
7. Create tag signals. For details, see [Create a Local Signal for Electrical Tags](#) (on page 356).
8. Connect the PLC to the cabinet using the cable you created.
9. Re-propagate the tag signal to the PLC. For details, see [Re-Propagate a Tag Signal](#).

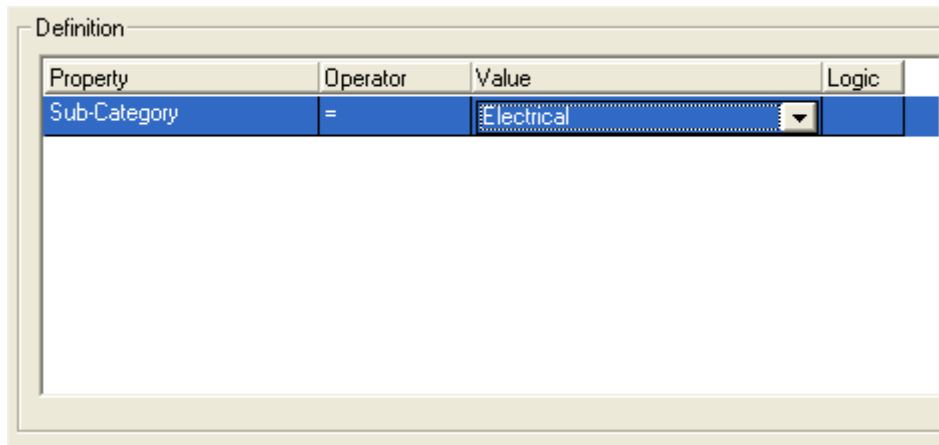
NOTE You can use macros related to SmartPlant Electrical signal data to generate Enhanced Report Utility reports or CAD application-based drawings. For details, see [SmartPlant Instrumentation Macro Structure](#).

Create a Device Panel for an Electrical Tag

This procedure shows you how to create a device panel for a tag that was created from retrieved data originating in SmartPlant Electrical.

1. Open the Wiring module.
2. Do one of the following:
 - On the toolbar, click .
 - Click **Actions > Device Panels**.

3. On the toolbar, click .
4. To display SmartPlant Electrical tags only, in the **Filter** dialog box, enter values as shown:



Property	Operator	Value	Logic
Sub-Category	=	Electrical	

5. Click **OK** to return to the **Device Panels** window.
6. Select a tag number and do one of the following:
 - Click **Actions > Create**.
 - On the toolbar, click .
7. On the **Create Device Panel and Cable** dialog box, select the required default panel, default cable, and connection type.
8. To apply the values that you set to all of the tags with incomplete profiles that you selected in the **Device Panels** window, select **Apply to all selected tags with incomplete profile**.

Create a Local Signal for Electrical Tags

This procedure shows you how to create a local signal in SmartPlant Instrumentation for tags that were created from retrieved data originating in SmartPlant Electrical.

1. If necessary, press **F7** to open the **Domain Explorer**.
2. Select one of the following:
 - A terminal strip that you created for an automatically generated cabinet (derived from the PDB in SmartPlant Electrical).
 - A field device panel.
3. Right-click the selected item, and on the shortcut menu, click **Actions > Connection**.
4. In the **Connection** window, do one of the following:
 - Right-click in the data window and on the shortcut menu, click **Manage Local Signals**.
 - On the module toolbar, click .
5. On the **Local Signal** dialog box, click **Filter**.
6. In the **Filter** dialog box, select **SmartPlant Electrical tags only**. This option selects only tags related to SmartPlant Electrical that do not have any connections.
7. Do one of the following:
 - Select **Pre-assigned signals only** to select only those electrical tags for which the SmartPlant Electrical signals have pre-assigned associations to a power distribution board.

- Clear **Pre-assigned signals only** to select all unconnected tags related to SmartPlant Electrical.
8. Click **OK** to return to the **Local Signal** dialog box.
 9. Select a tag number and click **Create** to create and associate the local signal with the tag number. Repeat this action for each tag number.

TIP SmartPlant Instrumentation creates the local signal and its name appears next to the instrument tag with which it is associated in the **Local Signal** dialog box.
 10. Click **Close**.

Flow of Activities for Defining Power Supplies

The following steps constitute the primary flow of activities when you use SmartPlant Instrumentation to define power supply requirements for instruments and cabinets:

1. In SmartPlant Instrumentation, press **F7** to open the **Domain Explorer**.
2. Expand the appropriate folder to display instruments or panels.
3. Right-click the desired instrument or panel, and on the shortcut menu, click **Properties**.
4. On the **General** tab of the dialog box for the selected item, select **Requires power supply**.

CAUTION If the cabinet originated from PDB information in SmartPlant Electrical, the power supply data for that cabinet belongs to SmartPlant Electrical. In this case, entering power supply data in SmartPlant Instrumentation results in the creation of a task in SmartPlant Electrical that generates an error when run. To prevent publishing of power supply data in this case, make sure that you clear **Requires power supply**.
5. Click the **Power Supply** tab and enter your electrical load data.
6. Click **OK** to close the dialog box.
7. Publish the data to SmartPlant Electrical. This creates an .xml document containing all SmartPlant Instrumentation data in the current plant such as the control system configuration, I/O assignment, PLC I/O card and channel, instrument tags, loop number, and so forth.

TIP The software creates the file in the path: <SmartPlant Instrumentation home folder>\XML\IO Assignment_data.xml.
8. Retrieve the data in SmartPlant Electrical and run the tasks there to create instruments and cabinets.
9. After assigning a PDB and circuit for each load, publish the data from SmartPlant Electrical.
10. In SmartPlant Instrumentation, retrieve the SmartPlant Electrical data. For details, see *Retrieve SmartPlant Electrical Data* (on page 353).
11. Run the tasks that the software generates as a result of the retrieve. For details, see *Run Tasks from the To Do List* (on page 504).
12. View the tag numbers or cabinets in SmartPlant Instrumentation and note that power distribution board data appears on the **Power Supply** tab of the appropriate dialog box.

NOTES

- The power distribution board data is also available for displaying in loop drawings.
- You can repeat this procedure as many times as you want to; SmartPlant Instrumentation recognizes new, modified, and deleted data that is published from SmartPlant Electrical.
- The data is owned by the application that created it. If you modify or delete the data in the application that does not own it, the next time you retrieve the data from the owner application, it overwrites any modified data, or reinserts data if it was deleted. A specific data property usually belongs to one or other of the applications.

Publish Data for SmartPlant Electrical

1. Open the Browser module.
2. In the **Browser Manager** window, do one of the following:
 - To publish electrical signal data, expand the hierarchy **Instrument Index > Electrical Tag Browser**.
 - To publish power supply data, expand the hierarchy **Instrument Index > Electrical Power Element Browser**.
3. Open the browser view, or create a new view.
4. On the toolbar, click **Print** .
5. At the prompt to preview the report, click **Yes**.
6. On the **Print Preview** window toolbar, click **Revisions** .
7. On the **Publish SmartPlant Electrical Data** dialog box, select **Publish document and data**.
IMPORTANT You must always choose this option when revising data in the SmartPlant Electrical Interface.
8. On the **Revisions** dialog box, click **New**.
9. On the SmartPlant Foundation **Revise** dialog box, beside **Revision Scheme**, select a value from the list.
10. Under **Revise in Tool**, beside **Major**, select a value from the list.
11. Click **OK** to implement the revision.
TIP When publishing in point-to-point mode, clicking **New** on the **Revisions** dialog box just adds a new line in which you can type the revision details.
12. Click **OK** to close the **Revisions** dialog box.
13. Click **SmartPlant > Publish**.
14. On the **Publish SmartPlant Electrical Data** dialog box, select **Publish document and data**.
IMPORTANT You must always choose this option when publishing in the SmartPlant Electrical Interface.
15. On the **Publish** dialog box, from the **Operation** list, select **Publish Now** or **Background Publish**.
16. Click **OK** to publish the data.
17. From the **Publish** message box, click **Close** if the publish operation was successful, or **View Log** if there were errors.

SmartPlant P&ID Interface

The SmartPlant P&ID interface allows you to import P&ID drawing data (for example; pipe runs, vessels and instruments) into your database from a SmartPlant P&ID database.

You import the P&ID data first by connecting to the appropriate SmartPlant P&ID database from which the SmartPlant Instrumentation Import Utility will import the drawing data.

After you connect to the SmartPlant P&ID database you select the source unit and source P&ID. With the source data selected, you can perform the import setup process and import the selected P&ID data.

NOTE In the SmartPlant P&ID Interface, when you create a new link for importing data into a table while connected to a plant, the software automatically creates the correct connection in the link properties.

IMPORTANT SmartPlant P&ID must be closed before starting the import session, to ensure that any modifications made to the drawings are properly imported to SmartPlant Instrumentation.

Importing SmartPlant P&ID Component Data

The Import Utility allows you to connect to a SmartPlant P&ID database, select a source plant, drawings, and item types and import P&ID components such as instrument tags, lines, or equipment into the SmartPlant Instrumentation database.

After the Domain Administrator imports SmartPlant P&ID link groups from the In_ctlog.db file using the **Administration** module options, the link groups appear in the **Link Explorer** in the Import Utility. The links in these groups have predefined mapping which you need to modify as you require. You cannot change the import method or table/module assignment of these links. It is possible to restore deleted SmartPlant P&ID links or link groups by re-importing the link groups from the In_ctlog.db file. Note, however, that to restore deleted links or link groups, you must first rename all the existing link groups or delete all the groups.

The following link groups are available in the In_ctlog.db file:

- **SmartPlant P&ID Equipment** — Contains four SmartPlant P&ID links for importing process equipment types into the EQUIPMENT_TYPE table and four links for importing process equipment into the EQUIPMENT table. You must first run the links that are used for importing equipment types.
- **SmartPlant P&ID Process Data** — Contains links you can use to import process data from SmartPlant P&ID into various tables that hold instrument or line process data, for example FLOW, PRESSURE, CONTROL_VALVE, LINE, and so forth. When importing data using **SmartPlant P&ID Process Data** group links, the software associates process data with instruments or lines automatically by importing relevant data into the PD_GENERAL table. You must redefine the mapping in these links according to your needs and SmartPlant P&ID source. Furthermore, for each link used to import SmartPlant P&ID instruments, you also need to define a filter to associate the SmartPlant P&ID with an appropriate process function in SmartPlant Instrumentation. For example, you can filter the source instruments according to their measures variable defined in SmartPlant P&ID and associate this measured variable with a specific process function. For details about defining a filter for the import source, see Specify a Filtering Condition.
- **SmartPlant P&ID Process Data - Macros** — Contains various links used to import SmartPlant P&ID items according to the item type.
- **SmartPlant P&ID Process Data + Macros** — Not in use.

See Also

Select SmartPlant P&ID Data for Import (on page 361)

Prerequisites for Importing SmartPlant P&ID Data

This topic lists and describes all the prerequisites you must meet before using SmartPlant P&ID to import data into SmartPlant Instrumentation. In addition to SmartPlant P&ID-specific prerequisites, make sure you have completed the general prerequisites (for details, see General Import Prerequisites).

IMPORTANT

- Before being able to import data, the predefined import links for SmartPlant P&ID must be available. To make the links available, you need to import the appropriate system interfaces into SmartPlant Instrumentation from the Administration module (for details, see *Import System Interfaces* (on page 349)).
- SmartPlant P&ID must be closed before starting the import session, to ensure that any modifications made to the drawings are properly imported to SmartPlant Instrumentation.

Setup and Database Platform Prerequisites

The following prerequisites address installation, software version, and database and connection issues:

- Install SmartPlant P&ID on the same machine where you want to perform the import using the Import Utility.
- Make sure that both SmartPlant P&ID and SmartPlant Instrumentation are of the same version.
- Make sure you have access rights for the .ini file associated with the site having the source SmartPlant P&ID plant.

NOTES

- If you want to connect to a SmartPlant P&ID database in Oracle, you must have an Oracle client installed on the machine where you run the Import Utility. You have to define the alias to the Oracle instance in which the source SmartPlant P&ID plant resides.
- If you want to connect to a SmartPlant P&ID database in SQL Server, you do not need to install an SQL Server client to access the source SmartPlant P&ID site in SQL Server if SmartPlant Instrumentation is not installed in SQL Server.

SmartPlant P&ID Prerequisite

To be able to import P&ID drawing names, make sure you have at least one item of type 'Instrument' in your drawing in the source SmartPlant P&ID plant.

IMPORTANT

SmartPlant P&ID must be closed before starting the import session, to ensure that any modifications made to the drawings are properly imported to SmartPlant Instrumentation.

Select SmartPlant P&ID Data for Import

Use this procedure to connect to a SmartPlant P&ID database and import P&ID components such as instrument tags, lines, or equipment into the SmartPlant Instrumentation database.

IMPORTANT Before using this procedure, make sure you meet all the prerequisites. For details, see *Prerequisites for Importing SmartPlant P&ID Data* (on page 360).

1. Do one of the following:
 - On the **Link Explorer** menu bar, click .
 - Click **Options > SmartPlant P&ID**.
2. On the **SmartPlant P&ID** dialog box, click **Open Plant** and select the .ini file associated with the plant containing the source data.
3. In the **Tree** pane, select a folder representing the desired hierarchy level.

TIP To select multiple drawings, in the **Tree** pane, select a plant hierarchy item at the lowest level (for example, a unit), and then in the **Contents** pane, hold down the **Ctrl** key while selecting the desired drawings.
4. Under **Item types**, select at least one check box, or select **All item types**.

TIP If you select multiple drawings and more than one item type, the software may take some time to retrieve the source data.
5. If desired, select the other options using the check boxes.

IMPORTANT

 - When selecting item types that have 1000 or more attributes, you must specify a limited number of attributes for importing. To do this, click **Attributes** and on the **Attributes** dialog box, select the check boxes only beside the attributes you want to import. Then, on the **SmartPlant P&ID** dialog box, select **Use attribute list**.
 - You must only select those attributes that are split in the import source into two separate attributes: one holding a field numeric and the other holding the appropriate unit of measure. For details, see *P&ID Attributes Split into Numeric and UOM Fields for Import* (see "P&ID Attributes Split for Import into Numeric and UOM Fields" on page 362).
 - Since the mapping of the SmartPlant P&ID links you imported from the In_ctlog.db file must be modified to fit the target naming conventions in SmartPlant Instrumentation, clear the **Run link group automatically** check box.
6. Click **OK** to close the **SmartPlant P&ID** dialog box.

See Also

Importing SmartPlant P&ID Component Data (on page 359)

P&ID Attributes Split for Import into Numeric and UOM Fields

In SmartPlant Instrumentation, values with units of measure are always represented by two separate fields in the database: one field holding a numeric value and the other field holding a unit of measure. Therefore, when mapping source and target fields for importing P&ID data, you must only map those source fields (P&ID attributes) that are split in the import source.

The following table lists the **Instrument** item type attributes in the P&ID source that are adapted for instrument index import. In the P&ID import source, each of these attributes has a numeric field with the suffix 1 indicating that the field value is numeric and suffix 2 indicating the field value is a unit of measure. You can check whether the attribute is split when opening the P&ID link in the **Import Link** window.

Instrument Item Type Attributes

t_cc_max_electcurrent
t_cc_max_levelreference
t_cc_max_vacuumpressure
t_cc_min_levelreference
t_cc_min_liquidlevel
t_cc_min_vacuumpressure
t_ipr_corrosionallowance
t_ipr_htracemediumtemp
t_ipr_pralternatedesign_max_flowrate
t_ipr_pralternatedesign_max_pressure
t_ipr_pralternatedesign_max_specificgravity
t_ipr_pralternatedesign_max_temperature
t_ipr_pralternatedesign_max_vaporpressure
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t_ipr_properating_min_pressure
t_ipr_properating_min_specificgravity
t_ipr_steamouttemperature
t_ipr_sp_jinsultemp
t_ipr_sp_jhtracemediumtemp
t_ipr_scheduleorthickness
t_ipr_prtest_min_viscosity
t_ipr_prtest_min_vaporpressure
t_ipr_properating_min_temperature
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t_piperun_prd_min_temperature
t_piperun_prd_min_vaporpressure
t_piperun_prd_min_viscosity
t_piperun_pro_base_compressibility
t_piperun_pro_base_massdensity
t_piperun_pro_base_molecularweight
t_piperun_pro_base_pressure
t_piperun_pro_base_specificgravity
t_piperun_pro_base_temperature
t_piperun_pro_max_compressibility
t_piperun_pro_max_cpcvratio
t_piperun_pro_max_criticalpressure
t_piperun_pro_max_massdensity
t_piperun_pro_max_massflowrate
t_piperun_pro_max_molecularweight
t_piperun_pro_max_pourpointtemp
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t_piperun_pro_min_viscosity
t_piperun_pro_norm_compressibility
t_piperun_pro_norm_cpcvratio
t_piperun_pro_norm_criticalpressure
t_piperun_pro_norm_flowrate
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t_piperun_pro_norm_massflowrate
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t_piperun_prt_min_temperature
t_piperun_prt_min_vaporpressure
t_piperun_prt_min_viscosity
t_piperun_sp_jaltdesignmaxflowrate
t_piperun_sp_jaltdesignmaxpress
t_piperun_sp_jaltdesignmaxtemp
t_piperun_sp_jaltdesignmaxviscosity
t_piperun_sp_jaltdesignminflowrate
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t_piperun_sp_joperbasepress
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t_piperun_sp_joperbasetemp
t_piperun_sp_jopermaxcompress
t_piperun_sp_jopermaxcpcvratio
t_piperun_sp_jopermaxcriticalpress

t_piperun_sp_jopermaxflowrate
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t_sr_praltdesign_min_temperature
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t_sr_prd_max_pressure
t_sr_prd_max_specificgravity

t_sr_prd_max_temperature
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t_sr_prd_max_viscosity
t_sr_prd_min_flowrate
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t_sr_pro_max_vaporpressure
t_sr_pro_max_viscosity
t_sr_pro_min_flowrate
t_sr_pro_min_pressure
t_sr_pro_min_specificgravity
t_sr_pro_min_temperature
t_sr_pro_min_vaporpressure
t_sr_pro_min_viscosity

PDS Interface

The PDS (Plant Design System) interface allows you to import P&ID components (for example, drawings, tags, and so forth) into your database from a PDS database.

You import the P&ID data first by connecting to the appropriate PDS database from which the Import Utility will import the drawing data. There are two PDS databases / schemas from which you need to import data:

- **Project Control Database** — this database contains the unit data and it has the same functions as the SmartPlant Instrumentation Administration data.
- **P&ID Source Database** — this database contains the actual P&ID drawing data.

After you connect to the PDS database you select the source unit and source P&ID. With the source data selected, you can perform the import setup process and import the selected P&ID data.

See Also

Importing PDS Data (on page 372)

Prerequisites for Importing PDS Data

This topic lists and describes all the prerequisites you must meet before importing PDS data into SmartPlant Instrumentation. In addition to PDS-specific prerequisites, make sure you have completed the general prerequisites (for details, see *General Import Prerequisites*).

IMPORTANT Before being able to import data, the predefined import links for PDS must be available. To make the links available, you need to import the appropriate system interfaces into SmartPlant Instrumentation from the Administration module (for details, see *Import System Interfaces* (on page 349)).

NOTES

- PDS and SmartPlant Instrumentation cannot work from the same SQL Server database server. This is because the sort order is different for the two applications, and databases with different sort orders cannot be located on the same server.
- The source text file profile is defined in the ODBC.ini registry folder.

See Also

Importing PDS Data (on page 372)

PDS Code Translation

The PDS interface supports a user-defined PDS code list. The PDS database stores information as codes that are not recognized by SmartPlant Instrumentation. When exporting data, the PDS application generates a set of files that are used to translate the PDS codes into data that SmartPlant Instrumentation can recognize. By selecting the appropriate option during the import setup process, the Import utility automatically replaces reference codes with the user-defined data stored in PDS code list files.

Code Translation Example

A file named *Attributes* (or *Attributes.txt*) contains a list of the source tables where the PDS data is located, some examples of which are shown below.

Table No.	Name	Data Type	Default Value	Units of Measure	App Type(s)	Description
0	system_unique_no	I4	0	0	1	'Occurrence no'
1	propagation_no	I2	0	0	1/1	'Propagation no'
2	company_name	A40	0	0	1	'Company name'
3	plant_name	A40	0	0	1	'Plant name'
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
109	instr_comp_type	C510	1	0	2	'Instr comp type'

Each database table includes a data type code that refers to a file containing a list of fields that belong to the table together with their codes. For example, the data type for table 109, instr_comp_type is C510. This refers to the file LIST.0510, part of which is as follows:

```
MAX=999
; 0510, Instrument Component Type (999)
1  ' '
;
16 'Instrument to Process line'
17 'Capillary tube'
18 'Mechanical link'
19 'Electric signal'
20 'Electric binary signal'
;
72 'Control valve'
78 'Solenoid valve'
```

This means that the PDS field with code no. 72 will be displayed in SmartPlant Instrumentation with the source name **Control Valve**.

Importing PDS Data

The PDS interface enables you to import drawing data. After the Domain Administrator imports four PDS link groups from the in_ctlog.db file using the **Administration** module options, the groups appear in the **Link Explorer** in the Import Utility. These links have predefined mapping which you may need to modify as you require. You cannot change the import method or table/module assignment of these links. It is possible to restore deleted PDS links by re-importing the link group from the in_ctlog.db file. Note, however, that to restore deleted links, you must first rename the PDS links or group or delete the entire group.

Also, when retrieving the PDS link group from the in_ctlog.db file, the software also retrieves the system codes and unit of measure codes. These codes are already adapted to SmartPlant Instrumentation, that is, every source code value in PDS is associated with its appropriate target value in SmartPlant Instrumentation.

It is possible to run all the PDS group links automatically in order of their appearance. Advanced users can perform a manual import process which allows you to carry out a step- by-step procedure. Importing data this way enables you to view and modify the default import parameters and link settings.

The following links are available in the link PDS link groups retrieved from the in_ctlog.db file:

- **PDS SUPPORT** — Allows you to import supporting table data into various tables such as COMPONENT FUNCTION TYPE PDS, LOOP PROC PDS, and EQUIPMENT TYPE.
- **PDS** — Allows you to import PDS data into various tables such as EQUIPMENT PDS, LOOP PDS, and COMPONENT PDS.

Select PDS Data for Import

Use this procedure to connect to a PDS database and select the desired data for import.

IMPORTANT

- Before using this procedure, make sure you meet all the prerequisites. For details, see *Prerequisites for Importing PDS Data* (on page 371).
 - When importing PDS data, you must always use the PDS interface to connect to the source data files before you can run the links from the **Link Explorer**. You cannot create and run links outside of the interface.
1. Do one of the following:
 - On the **Link Explorer** menu bar, click .
 - Click **Options > PDS**.
 2. On the **PDS** dialog box, from the **DBMS** list, select a database platform.
 3. In the **Name** box, do one of the following:
 - If you chose one of the Oracle database platforms, type a connection string.
 - If you chose an ODBC platform, select the profile name from the list.
 4. In the **Project control database** section, do the following:
 - a. In the **Name** box, type the appropriate PDS Control Database Project name where the source unit and drawing number data is located (for example pds_control_db).
 - b. In the **Password** box, type the password required to connect to the PDS Control Database Project.
 5. In the **P&ID source database** section, do the following:
 - a. In the **Name** box, type the appropriate PDS P&ID source database name where the source loop, tag number, and wiring data is located (for example pds_source_db).
 - b. In the **Password** box, type the password required to connect to the PDS P&ID source database.
 6. Use the **PDS codes** section for importing fields that are defined in PDS by code numbers only. The PDS application generates the export files which are used to translate the PDS codes into data that can be recognized by SmartPlant Instrumentation.

IMPORTANT

- The PDS export files must be located in two sub-folders: the first sub-folder, named Data, contains a file called Attributes (with or without a .txt extension) and the second sub-folder, named Codes, contains a set of list files with the field names referenced by the Attributes file. (For an explanation of the contents of these files, see *Code Translation Example* (on page 371).)
 - Both of the sub-folders must be in the same parent folder.
7. Under **PDS codes**, click **Browse** to navigate to the full path of the PDS code description file, for example:
 C:\SmartPlant\Instrumentation\Import\Code\Attributes.txt
 8. Select the **Use code description** check box to replace the PDS codes with their descriptions, after selecting the appropriate PDS code description file in the previous step.

NOTES

- If you choose to use the code description option and an equivalent for the code in SmartPlant Instrumentation is not found, the field code will be imported from the PDS database.

- If you know that SmartPlant Instrumentation will recognize all the source field names, clear the **Use code description** check box, so that the software will not check the Attribute and Codes files, thus speeding up the import process.
9. Click **Connect** to connect to the database specified in the **PDS** dialog box.
NOTE If the connection fails, an appropriate message is displayed, in which case you need to correct the database logon information.
 10. On the **Drawing Selection** dialog box, select the desired drawings that contain PDS data to be imported as follows:
 - a. From the **Unit** list, select the desired source PDS Unit. This displays the P&ID drawings in this PDS unit in the **Drawings** pane.
 - b. Do one of the following:
 - Select the **Select all** check box to select all the P&ID drawings so that all data in the PDS unit will be imported.
 - Select any P&ID drawings that you want to include in the import process. Use **Ctrl** or **Shift** to make multiple selections.
- NOTE** SmartPlant Instrumentation will only import the data in the selected drawings.
11. If desired, you can translate (expand) P&ID tags to instrument tags as follows:
 - a. Click **Macro** to define associations between PDS macros and SmartPlant Instrumentation typical tags.
 - b. Select **Additional tags based on macros** to use the macro association definitions to create new tags in SmartPlant Instrumentation based on the imported data. On selecting this option, you can also select the **Insert original PDS tag** check box to include in the import the P&ID tags that were expanded (for details, see *PDS Macro Expansion* (on page 375)).
 - c. Select **Use measured variable** to use the measured variable in the PDS database (in the instr_comp table) to modify the typical tag name when creating the instrument type in SmartPlant Instrumentation. Clear the check box to use the typical tag name as is.
- TIP** An instrument type will be created for the tag only if it has a unique description in the SmartPlant Instrumentation database.
12. Do one of the following:
 - Clear **Run link group automatically** if you need to modify any of the links before importing the data.
 - Select **Run link group automatically** to select a particular link group and run all the links in it automatically.
13. Click **OK** to continue the import process.

NOTES

- If you selected to run the link groups automatically, the **Select Link Group** dialog box opens for you to select the desired group of PDS links to import.
- If you selected not to run the link groups automatically, the **Drawing Selection** dialog box is minimized and you can:
 - Open a link to modify it.
 - Run a single import link or a group of links.
- You can select to execute a previously saved link group or link. In these cases the Import Utility automatically selects all the required drawing data of the source PDS Unit.

See Also

Importing SmartPlant P&ID Component Data (on page 359)

PDS Macro Expansion

Since P&ID information is sometimes more generalized than the information found in instrumentation drawings, it is possible to represent a single P&ID tag in an instrumentation drawing by several SmartPlant Instrumentation instrument tags. If a P&ID tag has a macro, you can map it in SmartPlant Instrumentation to one or more typical instruments. In this way, SmartPlant Instrumentation can use the macro to expand a single P&ID tag to several instrument tags when importing P&ID data from PDS.

For example, suppose you have a P&ID drawing with a tag number V-999. This tag actually consists of a positioner and an I/P transducer. If the **Additional tags based on macros** check box is selected, the original tag will be translated (expanded) and two new tags, one representing the positioner and the other representing the I/P transducer, will be imported into SmartPlant Instrumentation. If the **Insert original PDS tag** check box is selected, the original V-999 tag will also be imported into the SmartPlant Instrumentation database; if the check box is cleared, the V-999 tag will not be imported.

NOTES

- You can include custom fields in your typical tag definitions. The information you include in these fields will then be copied to the tags that are created from the typical tags when expanding the P&ID tag data. You can view the custom fields by defining a new style in an Instrument Index Standard Browser view that includes these fields. For details of how to create typical loops and typical tags, see Working with Typical Loops and Tags.
- Macro expansion will be performed only for the P&ID tags that are associated with the drawings you selected on the **Drawing Selection** dialog box and for which macros exist.

Define PDS Macro Settings

1. On the **Drawing Selection** dialog box, click **Macro**.
2. On the **Edit PDS\SP-P&ID Macro** dialog box, click **Insert** to add a new line, and in the **Macro name** column, type the desired macro name.

TIPS

- Macro names can be found in the PDS P&ID schema in the name_txt column of the instr_comp table.
 - When defining a macro associated with more than one instrument type, remember to use the same macro name for each line as appropriate.
3. Click **Assign** and use the **Find Tag** dialog box to select the desired typical instrument to assign to the macro.
 4. Repeat steps 2 and 3 for each typical instrument you want to assign to a macro.

Run PDS Import Links

1. Select the desired data for import with the PDS interface. For details, see *Select PDS Data for Import* (on page 373).
2. In the **Link Explorer**, expand the group **1.PDS SUPPORT** and select the link **COMPONENT FUNCTION TYPE PDS**.
3. Click  to open the **Parameter Settings** dialog box for the link.
4. Click the **Source** tab.
5. Under **Assign process function**, click **Define**.
6. If this is the first time you are running the link, on the **Define Instrument Type Fields** dialog box, do the following:
 - a. From **Source**, drag the field **instr_funcnt_id** to **Instrument type name**.
 - b. From **Source**, drag the field **instr_comp_type** to **Instrument type description**.
 - c. Click **OK**.
7. On the **Process Function Mapping** dialog box, for each instrument type in the left section, drag the appropriate process function from the right section to the **Process function** column.

IMPORTANT

- After the first time you run the link, some of the instrument types will already have process functions defined by default - these are displayed with a gray background, and you cannot reassign the process functions. Unassigned fields are shown with a light blue background, and assigned fields with a white background.
 - Whenever you run either of the import links: **COMPONENT FUNCTION TYPE PDS** or **COMPONENT PDS (INSTRUMENT TYPE)**, you should check that the mapping is correct and update it if required (if running both links, you need only check the mapping once).
8. When done, click **OK** to return to the **Parameter Settings** dialog box.
 9. Click **OK** to close the **Parameter Settings** dialog box.
 10. Click  to open the **Import Link** window for the selected link with the sources you selected (**instr_comp_type** and **instr_funcnt_id**) already assigned to database targets.
 11. If desired, you can display the source codes for this link (PDS instrument type code and instrument type functional ID) as follows:
 - a. Click .
 - b. Click **File > Exit** to return to the **Import Link** window.
 12. Click  to import the data.
 13. For each of the links in this group, and for all the links in the group **2.PDS**, repeat the above steps of this procedure (if prompted to overwrite existing data, click **Yes**).

NOTES

- For certain links in the group **2.PDS**, you are required to enter the source fields for defining naming conventions before running the link.
- Some links import fields from more than one table. In such cases, the field name (excluding the table prefix) appears in the **Source Name** column. If you attempt to run the import process, an error message is displayed (Condition is not valid). To correct this, delete the field name indicated in the message from the **Source Name** column, and drag the appropriate field name (which includes the table prefix) to the **Source Name** column.

14. Open SmartPlant Instrumentation and examine the imported data in the Browser or Instrument Index module.

DCS Vendor Interfaces

The DCS Vendor interfaces allow you to share data between SmartPlant Instrumentation and the appropriate DCS vendor software at the component/card level. If, for example, you design a loop that needs to be controlled by a particular DCS system, you need to connect the loop wiring to I/O cards in the DCS for the vendor that you specify. SmartPlant Instrumentation supports the following DCS vendors:

DCS Product Name	Vendor	Available Activities
DeltaV	Emerson	Bidirectional publish and retrieve
Yokogawa - CENTUM CS 3000	Yokogawa	Bidirectional publish and retrieve
ABB	ABB	Retrieve I/O card catalog definitions only
Honeywell	Honeywell	Retrieve I/O card catalog definitions only

NOTES

- All DCS vendors support both conventional and Foundation Fieldbus instruments. In addition, DeltaV supports HART, CHARM, and S-Series instruments.
- You are allowed to specify only one DCS vendor per domain.
- A number of shipped rules apply to SmartPlant Instrumentation items when used for specific DCS vendors. You can view these rules in the Rule Manager under **Interfaces**.

SmartPlant Instrumentation - DCS Vendors: Comparative Terminology

Although the SmartPlant Instrumentation - DCS vendor interfaces effect automated transfer of definitions and data, it is important to understand some of the differences in terminology between SmartPlant Instrumentation and different DCS vendors. The following is a partial list:

SmartPlant Instrumentation Dialog Box	SmartPlant Instrumentation Terminology	DeltaV Terminology	CENTUM CS 3000 Terminology
Distributed Control System (DCS) Properties; Racks	Rack	Carrier	Node
Racks	Slot	Position	
	Card		Module
I/O Card Properties; Strip Type	Strip Type	I/O Card Type	

SmartPlant Instrumentation Dialog Box	SmartPlant Instrumentation Terminology	DeltaV Terminology	CENTUM CS 3000 Terminology
Channels; Channel Types	Channel Type	I/O Channel Type	
Channels; Terminal Properties	Channel (conventional)	Channel	Terminal
	Channel (fieldbus)	Port	
	I/O Termination		Termination Board
Fieldbus Instrument Tag Association	Instrument Type + Description	Device Type	

Prerequisites for Working with DCS Vendor Interfaces

The DCS vendor interfaces function for any Oracle or SQL Server database that is approved for SmartPlant Instrumentation Version 2009. For details, see *SmartPlant Instrumentation Installation Guide*, *Installing SmartPlant Instrumentation on Oracle* and *Installing SmartPlant Instrumentation on SQL Server*.

Make sure that you have Internet access to the URL from which you download the particular DCS vendor definitions document.

Before you can work with any DCS vendor interface, you must perform the following actions:

1. Install the SmartPlant Schema Component from the SmartPlant Instrumentation CD Browser (click **Add-In Software**, and then click **Schema Component Installation**).
TIP On the **Select Optional Features** page, clear the **Schema Editor** check box if you do not need to use the Schema Editor.
2. Install the SmartPlant Client from the SmartPlant Instrumentation CD Browser (click **Add- In Software**, and then click **SmartPlant Client Installation**).
TIP On the **Select Features** page, make sure that you clear the **SmartPlant Automatic Retrieval** check box.
3. Configure SmartPlant Instrumentation to work in file mode. For details, see *Configure SmartPlant Instrumentation to Publish and Retrieve Data in File Mode* (on page 379).
4. The System Administrator must enable the item registry. For details, see *Enable Item Registry* in the *Administration User's Guide*, under *System Administration*, *Domain Management*.
5. The System Administrator must specify the XML path to the folder in which the IntoolsMap.xml and ContextMap.xml files are located; this must be done for each domain where you intend to publish DCS vendor data. By default, these files are located in the path: <SmartPlant Instrumentation home folder>\XML\.
6. The Domain Administrator must register the items. For details, see *Register Items* in the *Administration User's Guide*, under *Working in an Integrated Environment*.

- The Domain Administrator must ensure that the SmartPlant Instrumentation and DeltaV naming conventions are identical and that function blocks are defined using free segment naming conventions as shown.

Convention: Foundation / Profibus PA Virtual Tag (dropdown) [ISA Standard] [Loop Standard]

Sample: A Length: 1

☐ Remove trailing spaces in each segment ☐ Remove spaces in file names

Segment Category	Seq.	Separator	Segment	Start	Length
Free Segment	1		FREE SEGMENT	1	21

- Create new instrument type definitions in SmartPlant Instrumentation as needed to match those in DeltaV.
- Optimize your SmartPlant Instrumentation preferences for the interface with your selected DCS vendor. For details, see *Interfaces > DCS Vendors (Preferences)* (on page 25).

See Also

Flow of Activities for Configuring DeltaV (on page 380)

Flow of Activities for Configuring Yokogawa CENTUM CS 3000 (on page 391)

Configure SmartPlant Instrumentation to Publish and Retrieve Data in File Mode

- Close any programs that are currently running.
- On the Windows desktop, right-click the **My Computer** icon, and on the shortcut menu, click **Properties**.
- Click the **Advanced** tab.
- Click **Environment Variables**.
- Under **System variables**, click **New**.
- On the **New System Variable** dialog box, in the **Variable name** field, type **EFCommonuifilemode** and in the **Variable value** field, type **1**.

New System Variable

Variable name: EFCommonuifilemode

Variable value: 1

[OK] [Cancel]

Flow of Activities for Configuring DeltaV

This topic describes the primary flow of activities when you use SmartPlant Instrumentation to design a plant to be run and controlled using the Emerson DeltaV plant automation and control system.

NOTES

- Before publishing or retrieving DeltaV data for the first time, make sure that you perform the prerequisite activities indicated: retrieving DeltaV definitions, updating your plant design, and if appropriate, associating Foundation Fieldbus device types.
- You may perform any of the stages of this flow of activities multiple times during the project life cycle.

Retrieve DeltaV Definitions

Retrieving DeltaV definitions is a prerequisite for both publishing and retrieving DeltaV data. The DeltaV item definition documents that you download and retrieve in SmartPlant Instrumentation constitute the engineering library of DeltaV objects - the DeltaV DCS (Distributed Control System), Foundation Fieldbus, CHARM, S-Series, Conventional, and HART elements, and entries for supporting tables such as **Manufacturer**, **Model**, and so forth. For more information, see *Retrieve DeltaV Definitions* (on page 385).

Update Your Plant Design

Prior to publishing or retrieving data, you must update your plant design using the DeltaV-compatible objects now available in the **Reference Explorer** and supporting tables of your SmartPlant Instrumentation database. From the perspective of SmartPlant Instrumentation, the DeltaV DCS (Distributed Control System) panel is a DCS in the **Reference Explorer** from which you create a specific DeltaV DCS in the **Domain Explorer**. You can then create appropriate sub-items and perform wiring connections as desired.

IMPORTANT In the **Reference Explorer**, do not change any of the values in the items that you retrieved from the DCS vendor.

Publish Data for DeltaV

After you complete the process of designing your DeltaV-compatible plant in SmartPlant Instrumentation, use this procedure to publish (export) the required data for accurate and efficient DeltaV configuration. The software publishes a partial set of the SmartPlant Instrumentation database, including data such as the DeltaV configuration, I/O assignment, instrument tags, and so forth (the process does not export specification data, for example). For details of the procedure to publish data, see *Publish Data for DeltaV* (on page 390).

After retrieving the published data in DeltaV, validate and, if necessary, reconcile the data with the DeltaV database.

Retrieve DeltaV Data

Use this procedure to retrieve (import) data from DeltaV. The software retrieves controllers and slots and, if specified in the published .xml file, Foundation Fieldbus devices. For details of the procedure to retrieve data, see *Retrieve DeltaV Data* (on page 386).

IMPORTANT If using fieldbus tags, after retrieving the DeltaV data, but before running any To Do List tasks, you must make associations between device types for Foundation Fieldbus or HART instruments with instrument manufacturers, and SmartPlant Instrumentation instrument types. For more information, see *Associate Device Types for DCS Vendors* (on page 396).

Data Limitations for the DeltaV Interface

When you prepare a SmartPlant Instrumentation domain for publishing to DeltaV, you must be careful to enter values with limitations according to the table that follows. In most cases, the software validates the data; however, it does not validate data that you merge in the database or data that you enter via a browser view; in these cases, it is up to you to check that the values comply with these limitations.

IMPORTANT

- SmartPlant Instrumentation validates the data only if the DCS manufacturer name is **Emerson Process**.
- If you intend to publish fieldbus data, set the relevant option on the **Preferences** dialog box. For details, see *Interfaces > DCS Vendors (Preferences)* (on page 25).
- Spaces are not allowed in DeltaV tags, therefore, when publishing data, SmartPlant Instrumentation removes spaces in instrument and Control System tags. You can specify a substitute character, such as an underscore, to replace the spaces; to do so, you must add the following line in the Intools.ini file under the [API] section:
NameSpacesReplacement = "_"
It is recommended not to select any character that appears in the tag names as the substitute character because when retrieving data back from DeltaV, SmartPlant Instrumentation replaces that character with spaces again.

Item Type	Limitation
I/O Card	The DCS manufacturer name is Emerson Process and this must not be modified.
I/O Card	The card name must begin with an uppercase 'C' followed by a numeric value, for example C16 .
Rack	The rack name must be a numeric value.
Slot	The slot name must be a numeric value between 1 and 8 characters.
Controller	The controller name must be unique in the domain.
Controller	The controller name must be uppercase and between 1 and 16 characters.

Units of Measure Limitations

To avoid errors when publishing data, only those units of measure that are supported by DeltaV should be available for selection. To set the available units of measure, click **Tools > Units of Measure Codes**, and clear the **Enabled** check boxes for all units of measure **except for** those that appear in the following table.

Unit of Measure Code	Unit of Measure Name	Unit of Measure Type
%	Percent	PT
%V	Percent of volume	PT
%W	Percent of weight	PT
μF	μF	FA
μH	μH	HE

Unit of Measure Code	Unit of Measure Name	Unit of Measure Type
μm	micrometer	LN
1/°C	1/Degree C	LE
1/°F	1/Degree F	LE
A	A	CU
Btu IT/ft ³	Btu IT/ft ³	CV
Btu IT/h	Btu IT/h	WT
Btu IT/s	Btu IT/s	WT
Btu_IT/(ft^2-h-degf)		
Btu_IT/lbm		
Btu_IT-in/(h-ft^2-degF)		
BtuIT/lb°F	Btu(IT)/(lb°F)	SH
Btuth/lb°F	Btu(th)/(lb°F)	SH
cal IT/m ³	cal IT/m ³	CV
Cal_IT/g		
Cal_th/g		
cm ²	centimeter ²	AR
cm ² /s	cm ² /s	VS
cS	centistokes	VS
D	Days	
ft ²	foot ²	AR
ft ² /s	ft ² /sec.	VS
ft ³	ft ³	VM
g	gram	ML
G	in/s ²	AC
h	hours	TT
HP	Horse Power	WT
Hz	Hz	FQ
in ²	inch ²	AR
in ² /s	in ² /sec.	VS
in ³	in ³	VM
J/(kg·K)	J/(kg·K)	SH
J/kg	J/kg	LH

Unit of Measure Code	Unit of Measure Name	Unit of Measure Type
kg	kilogram	ML
kg/m	kg/m	WL
kgf	kilogram-force	FR
kHz	kilo Hertz	FQ
KJ/m ³	Kilo Joule per cubic meter	CV
kJ/(kg·K)	kJ/(kg·K)	SH
kJ/(kg·°C)	kJ/(kg·°C)	SH
**kJ/kg	kJ/kg	LH
km	kilometer	LN
km ²	kilometer ²	AR
Kohm	Kohm	OM
kV	kilo Volt	VO
kVA	kiloVolt-ampere	
kVAr	kiloVolt-ampere reactive	WR
kW	kilo Watt	WT
L	L	VM
lb	pound	ML
Lbf	lb-force	FR
Lbm/ft		
Lm	lumen	LI
m ²	Square Meter	AR
m ² /s	m ² /sec.	VS
m ³	Cubic Meter	VM
mA	mA	CU
Mg	milligram	ML
mg/m ³	milligram/cubic meter	DN
mH	mH	HE
MHz	Mega Hertz	FQ
Mi^2_int		
Micron	micron	LN
Mile	mile	LN
mile ²	mile ²	AR

Unit of Measure Code	Unit of Measure Name	Unit of Measure Type
MILS	1/1000 inch	LN
Min	minutes	TT
mm/s	millimeter/sec.	VL
mm/s ²	mm/s ²	AC
mm ²	millimeter ²	AR
mm ² /s	mm ² /s	VS
Mohm	Mega Ohm	OM
mPa-s		
mV	mV	VO
mW	mW	WT
MW	Mega Watt	WT
N	newton	FR
nF	nF	FA
°	degree	AN
Ohm	ohm	OM
Ohm/m	Ohm/m	RF
oz	ounce	ML
PPMV	a millionth volume	PT
PPMW	a millionth weight	PT
Rad	radian	AN
Rpm	revolutions per min	FQ
S	seconds	TT
St	stokes	VS
T	metric ton	ML
US gal	US gallon	VM
V	V	VO
W	W	WT
yd ²	yard ²	AR

See Also*Flow of Activities for Configuring Yokogawa CENTUM CS 3000 (on page 391)**Publish Data for Yokogawa CENTUM CS 3000 (on page 394)*

Retrieve DeltaV Definitions

IMPORTANT

- Before you start this procedure, make sure that you have an Internet connection and a valid Intergraph customer user name and password.
 - SmartPlant Instrumentation is only capable of handling certain I/O types that DeltaV supports. For this reason, not all of the I/O cards that you download in the DeltaV definitions are compatible with SmartPlant Instrumentation: for example, the interface does not handle SI and Serial cards.
1. In SmartPlant Instrumentation, click **Tools > Interfaces > DeltaV**.
 2. Under **Data transfer mode**, select **Retrieve DeltaV definitions** and click **OK**.
 3. To download the DeltaV definitions files, do the following:
 - a. On the **Retrieve DeltaV Definitions** dialog box, beside **Default DeltaV definitions URL**, click **Download**.
 - b. On the Web page that opens, complete the form and click **Submit**.
 - c. Follow the instructions for downloading the files.
 - d. On the **File Download** dialog box, click **Save**.
 - e. On the **Save As** dialog box, navigate to the desired folder and click **Save**.
 - f. On the **Download Complete** dialog box, click **Close**.
 4. On the **Retrieve DeltaV Definitions** dialog box, click **Browse** and navigate to the folder where you downloaded the DeltaV definitions files.
 5. Under the **Select** column, select the documents that you want to retrieve in SmartPlant Instrumentation and click **OK**.

IMPORTANT

If retrieving the HART definition file in order to publish and retrieve HART instruments, you must first retrieve the fieldbus definition file.

6. When done, click **Cancel**.

NOTES

- The DeltaV definitions are added to the DCS Panels folder of the Reference Explorer. The 3 types of panel are:
 - DeltaV CHARM
 - DeltaV Conventional
 - DeltaV S-Series
- Once you have retrieved Foundation Fieldbus or HART definitions, you can use them to make appropriate associations among Foundation Fieldbus device types, instrument manufacturers, and SmartPlant Instrumentation instrument types. For details, see *Associate Device Types for DCS Vendors* (on page 396).
- When retrieving DeltaV definitions, the software automatically adds new definitions and updates any modifications to definitions that already exist in the SmartPlant Instrumentation database. However, you must delete any redundant definitions manually from the **Reference Explorer**.

See Also

View the Log File for a DCS Vendor (on page 397)

Retrieve DeltaV Data

IMPORTANT Before retrieving data, you must configure SmartPlant Instrumentation to work in file mode. For details, see *Configure SmartPlant Instrumentation to Publish and Retrieve Data in File Mode* (on page 379).

1. In SmartPlant Instrumentation, click **Tools > Interfaces > DeltaV**.
2. Under **Data transfer mode**, select **Retrieve DeltaV data** and click **OK**.
3. In the **Select Data XML File** window, navigate to the .xml file that contains the DeltaV data and click **Open**.

TIP After selecting the file, two more windows open: **Select Meta-data XML File** and **Select Tombstones XML File**. Just click **Cancel** in both of these windows.

4. On successful completion of the retrieval, click **Close** on the message box that appears, or if errors occurred, click **View Log** to troubleshoot them.
5. Click **SmartPlant > To Do List**.

IMPORTANT If using fieldbus tags, after retrieving the DeltaV data, but before running any tasks from the To Do List, you must make associations between Foundation Fieldbus device types, instrument manufacturers, and SmartPlant Instrumentation instrument types. For more information, see *Associate Device Types for DCS Vendors* (on page 396).

6. In the **To Do List** window, select all the **Create** tasks for the DeltaV items; however, **do not** select the **Update** task for the CS Tag.
7. From the **To Do List** toolbar, click **Run Task** .

TIPS

- Performing this action creates the DeltaV controllers, slots, I/O cards, and so forth in the Domain Explorer under the **Controllers** folder.
 - For more details of available options when running tasks, see *Run Tasks from the To Do List* (on page 504).
8. In the **Domain Explorer**, create a DCS and rack as needed, and then drag a DeltaV slot to the rack.
 9. In the **To Do List** window, run the **Update** task for the CS Tag.

See Also

View the Log File for a DCS Vendor (on page 397)

Crucial Fields for the DeltaV Interface

When you prepare a SmartPlant Instrumentation domain for publishing to DeltaV, you must be careful to enter values according to the table that follows.

IMPORTANT

- If you diverge from the following table and its notes, the software does not validate the data; however, the DeltaV reconciliation program will reject data values that are incompatible. For complete details of the exact DeltaV values to use, please refer to your DeltaV Hardware Manual.
- If you intend to publish fieldbus data, set the relevant option on the **Preferences** dialog box. For details, see *Interfaces > DCS Vendors (Preferences)* (on page 25).

The entries in the Value column indicate you must act as follows:

- **A - Accept DeltaV Value** — Do NOT change the value of this field.
- **E - Enter Valid Value** — Accept the value retrieved from DeltaV, if one exists, or enter a different valid value.

- **O - Optional Value** — Accept the value retrieved from DeltaV, if one exists, or enter a different valid value, or enter no value.
- Any other entry - the value must be as stated.

Dialog Box	Field	Value	Notes
DCS Properties	Type	O	
DCS Properties	Manufacturer	O	
Rack Properties	Number of Slots	E	• In the Racks dialog box, under Rack position numbering, accept the default selection of Start from one. • In the data window, for each rack that you create, type the value 8 under Number of slots.
Rack Properties	Rack position numbering	E	• In the Racks dialog box, under Rack position numbering, accept the default selection of Start from one. • In the data window, for each rack that you create, type the value 8 under Number of slots.
Slot Properties	Controller	E	A controller name must be uppercase, and no more than 16 characters. You must assign each controller to slots that share the associated I/O card.
Controllers	Controller	E	A controller name must be uppercase, and no more than 16 characters. You must assign each controller to slots that share the associated I/O card.
Controllers	Redundant	E	
Controllers	Manufacturer	Emerson Process	
I/O Card Properties, General tab	Series	A	
I/O Card Properties, General tab	Type	A	
I/O Card Properties, General tab	Manufacturer	A	
I/O Card Properties, Control System tab	I/O type	A	

I/O Card Properties, Control System tab	Rack/Carrier	E	
I/O Card Properties, Control System tab	Define a redundant I/O	A	If you are defining a DeltaV redundant I/O card for a DCS panel, make sure that • In the Primary location group box the value of Position is an odd number. • The value of Position for the Secondary location is an even number greater than the Position value for the Primary location.
Terminal Properties	Terminal	E	
Terminal Properties	Sequence	A	
Terminal Properties	Terminal color	E	
Terminal Properties	Channel	A	
Channels	Channel	A	
Channels	Enable	E	
Channels	Channel type	E	DeltaV redundant I/O cards are wide and therefore occupy two adjacent slots in their carriers. The cards can only be placed in odd-numbered slots. DeltaV I/O cards have their terminations on the I/O cards themselves, so there is no need for separate termination cards to be connected to the I/O cards. On the Control System tab of the I/O Termination dialog box, you must select the Define a redundant I/O card check box. On publishing the data, this indicates to DeltaV that the card is defined as a redundant double-width I/O card.

Channel Types	Channel type	A	DeltaV redundant I/O cards are wide and therefore they occupy two adjacent slots in their carriers. Note that the cards can only be placed in odd-numbered slots. DeltaV I/O cards have their terminations on the I/O cards themselves, and so there is no need for separate termination cards to be connected to the I/O cards. On the Control System tab of the I/O Termination dialog box, you must select the Define a redundant I/O card check box. On publishing the data, this indicates to DeltaV that the card is defined as a redundant double-width I/O card.
Tag Number Properties, General tab	Manufacturer	E	You can use only the following DeltaV cards as redundant I/O cards: • AI_8CH_HART_4-20_RED • AO_8CH_HART_4-20_RED • RFIC • DI_8CH_24VDC_DCT_RED • DO_8CH_24VDC_HSS_RED • RED_PROG_SERIAL_32DS • RED_SERIAL_32DS
Tag Number Properties, Fieldbus tab	Field device address	E	After you retrieve DeltaV definitions, the Channel Types supporting table is populated with DeltaV-compatible channel types for DeltaV-compatible I/O strip types. These are the only DeltaV-compatible values for the Channel Type field in the Channels dialog box.
Tag Number Properties, Fieldbus tab	Fieldbus device revision	E	• When you create a fieldbus tag based on a given instrument type, on the General tab of the Tag Number Properties dialog box, make sure that the value that you select from the Manufacturer list is among the acceptable values that you set for this instrument type during retrieval from DeltaV. • The values available on the Fieldbus tab of the Tag Number Properties dialog box under Fieldbus device revision are determined by the value that you select from the Manufacturer list on the General tab.

Tag Number Properties, Fieldbus tab	Backup link master	E	- On the Fieldbus tab of the Tag Number Properties dialog box, select the Backup link master check box only for a device that you verified is capable of being a backup. - On the Fieldbus tab of the Tag Number Properties dialog box, under Field device address, you must type a value between 20 and 35 (inclusive). If you selected the Backup link master check box, and enter 20 as a value for Field device address.
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Publish Data for DeltaV

IMPORTANT Spaces are not allowed in DeltaV tags, therefore, when publishing data, SmartPlant Instrumentation removes spaces in instrument and Control System tags. You can specify a substitute character, such as an underscore, to replace the spaces; to do so, you must add the following line in the Intools.ini file under the [API] section:
NameSpacesReplacement = "_".

- In any SmartPlant Instrumentation module, click **Tools > Interfaces > DeltaV**.
- On the **DeltaV Interface** dialog box, under **Data transfer mode**, click **Publish SmartPlant Instrumentation data**, and then click **OK**.

TIP If prompted to enable the item registry (even though your System Administrator has already activated this option as required), contact SmartPlant Instrumentation support.
- On the **Plant Controller Selection** dialog box, do one of the following:
 - To publish all relevant database fields for DeltaV, select the **Select all** check box.
 - For publishing of data associated with a given controller, select the **Select** check box next to that controller.
- On the **Publish to File** dialog box, under **Folder to save XML** files, type the path for DeltaV publishing, and click **OK** to publish the .xml file for the first controller that you selected.
- For each additional controller that you selected in the SmartPlant Instrumentation **Plant Controller Selection** dialog box, when the **Publish to File** dialog box reopens, click **OK**.

NOTES

- SmartPlant Instrumentation publishes the data associated with each controller into a separate .xml file.
- On publishing data other than for the first time, DeltaV identifies changes as follows:
 - The software identifies new items created in SmartPlant Instrumentation as new items to be created in DeltaV.
 - If you move items, cards, CS tags, or if you modify item fields in SmartPlant Instrumentation, the software identifies these as items to be updated in DeltaV.
 - The software identifies items deleted in SmartPlant Instrumentation as items to be deleted in DeltaV.

See Also

Prerequisites for Working with DCS Vendor Interfaces (on page 378)

Flow of Activities for Configuring Yokogawa CENTUM CS 3000

This topic describes the primary flow of activities when you use SmartPlant Instrumentation to design a plant to be run and controlled using the Yokogawa CENTUM CS 3000 plant automation and control system. Note that the flow that follows may be performed multiple times during the project life cycle.

1. Retrieve the Yokogawa CENTUM CS 3000 Definitions

The Yokogawa CENTUM CS 3000 item definition documents that you download and retrieve in SmartPlant Instrumentation constitute the engineering library of Yokogawa CENTUM CS 3000 objects - Yokogawa CENTUM CS 3000 I/O cards, Foundation Fieldbus elements, and entries for supporting tables such as **Manufacturer**, **Model**, and so forth. For more information, see *Retrieve Yokogawa CENTUM CS 3000 Definitions* (on page 393).

2. Retrieve Yokogawa CENTUM CS 3000 Data

For more information, see *Retrieve Yokogawa CENTUM CS 3000 Data* (on page 394).

3. Update Your Plant Design

Using the Yokogawa CENTUM CS 3000-compatible objects now available in the **Reference Explorer** and supporting tables of your SmartPlant Instrumentation database, update your plant design. From the perspective of SmartPlant Instrumentation, the Yokogawa CENTUM CS 3000 panel is a DCS in the **Reference Explorer** from which you create a specific Yokogawa CENTUM CS 3000 DCS in the **Domain Explorer**.

IMPORTANT In the **Reference Explorer**, do not change any of the values in the items that you retrieved from the DCS vendor.

For information on how to make associations between Foundation Fieldbus device types, instrument manufacturers, and SmartPlant Instrumentation instrument types, see *Associate Device Types for DCS Vendors* (on page 396).

4. Publish Data for Yokogawa CENTUM CS 3000

The .xml document that you publish (export) is a partial set of the SmartPlant Instrumentation database, including data such as the Yokogawa CENTUM CS 3000 configuration, I/O assignment, conventional and fieldbus data, and so forth.

After you complete the process of designing your Yokogawa CENTUM CS 3000-compatible plant in SmartPlant Instrumentation, use this procedure to publish (export) the required data for accurate and efficient Yokogawa CENTUM CS 3000 configuration. You publish a partial set of the SmartPlant Instrumentation database, including data such as the Yokogawa CENTUM CS 3000 configuration, I/O assignment, instrument tags, and so forth. (The process does not export specification data, for example.) For more information, see *Publish Data for Yokogawa CENTUM CS 3000* (on page 394).

5. Retrieve Data Published from SmartPlant Instrumentation into Yokogawa CENTUM CS 3000

Following the retrieval, validate and — if necessary — reconcile the data retrieved from SmartPlant Instrumentation with the Yokogawa CENTUM CS 3000 database.

Data Limitations for the Yokogawa CENTUM CS 3000 Interface

When you prepare a SmartPlant Instrumentation domain for publishing to Yokogawa CENTUM CS 3000, you must be careful to enter values with limitations according to the table that follows. In most cases, the software validates the data; however, it does not validate data that you merge in the database or data that you enter via a browser view; in these cases, it is up to you to check that the values comply with these limitations.

IMPORTANT

- SmartPlant Instrumentation validates the data only if the DCS manufacturer name is **CENTUM CS 3000**.
- If you intend to publish fieldbus data, set the relevant option on the **Preferences** dialog box. For details, see *Interfaces > DCS Vendors (Preferences)* (on page 25).
- Only ONE I/O card is allowed per slot.
- Spaces are not allowed in Yokogawa CENTUM CS 3000 tags, therefore, when publishing data, SmartPlant Instrumentation removes spaces in instrument and Control System tags. You can specify a substitute character, such as an underscore, to replace the spaces; to do so, you must add the following line in the Intools.ini file under the [API] section:
NameSpacesReplacement = " _ "
It is recommended not to select any character that appears in the tag names as the substitute character because when retrieving data back from Yokogawa CENTUM CS 3000, SmartPlant Instrumentation replaces that character with spaces again.

Item Type	Limitation
Panel	The panel name is not allowed to exceed 7 characters.
Panel	The Panel DCS naming must start with the string "FCS".
Panel	The Panel DCS naming must contain two 2-digit numeric strings.
Panel	The first number in the panel DCS must be between 1 and 32.
Panel	The second number in the panel DCS must be between 1 and 64.
Panel	The Naming Convention for a default panel is read-only and must not be modified.
I/O Card	The DCS manufacturer name is CENTUM CS 3000 and this must not be modified.
I/O Card	The following properties are read-only and must not be modified: card type, I/O type, model, module, controller.
I/O Card	The card name and type must be the same.
I/O Card	A card can only appear under a slot.
I/O Card	The Naming Convention for default Wiring Equipment is read-only and must not be modified.

Item Type	Limitation
I/O Card	The controller or the module for a default card is read-only and must not be modified.
I/O Card	The series for I/O Wiring Equipment is read-only and must not be modified.
Control System Tag	The DCS function block name is not allowed to exceed 16 characters.
Control System Tag	The control strategy drawing number must be between 1 and 200.
Control System Tag	The control system tag description is not allowed to exceed 24 characters.
Channel	The channel name and sequence values must be the same.
Channel	The channel address is read-only and must not be modified.
Rack	The default rack name is read-only and must not be modified.
Rack	The cabinet rack name must be between 1 and 15 characters.
Slot	The slot name must be between 1 and 8 characters.
Slot	The controller for a default slot is read-only and must not be modified.

See Also

Publish Data for Yokogawa CENTUM CS 3000 (on page 394)

Retrieve Yokogawa CENTUM CS 3000 Definitions

IMPORTANT Before you start this procedure, make sure that you have an Internet connection and a valid Intergraph customer user name and password.

1. In SmartPlant Instrumentation, click **Tools > Interfaces > Yokogawa CENTUM CS 3000**.
2. Under **Data transfer mode**, select **Retrieve Yokogawa CENTUM CS 3000 definitions** and click **OK**.
3. On the **Retrieve Yokogawa CENTUM CS 3000 Definitions** dialog box, click **Browse**, navigate to the folder that contains the Yokogawa files, and click **OK**.
4. In the data window, under **Select**, select the documents that you want to retrieve in SmartPlant Instrumentation, and click **OK**.
5. When done, click **Close**.

NOTES

- Once you have retrieved Foundation Fieldbus definitions, you can use them to make appropriate associations among Foundation Fieldbus device types, instrument manufacturers, and SmartPlant Instrumentation instrument types. For details, see *Associate Device Types for DCS Vendors* (on page 396).

- When retrieving Yokogawa CENTUM CS 3000 definitions, the software automatically adds new definitions and updates any modifications to definitions that already exist in the SmartPlant Instrumentation database. However, you must delete any redundant definitions manually from the Reference Explorer.

See Also

View the Log File for a DCS Vendor (on page 397)

Retrieve Yokogawa CENTUM CS 3000 Data

IMPORTANT Before retrieving data, you must configure SmartPlant Instrumentation to work in file mode. For details, see *Configure SmartPlant Instrumentation to Publish and Retrieve Data in File Mode* (on page 379).

1. In SmartPlant Instrumentation, click **Tools > Interfaces > Yokogawa - CENTUM CS 3000**.
2. Under **Data transfer mode**, select **Retrieve Yokogawa - CENTUM CS 3000 data** and click **OK**.
3. In the **Select Data XML File** window, navigate to the .xml file that contains the Yokogawa data and click **Open**.
TIP After selecting the file, two more windows open: **Select Meta-data XML File** and **Select Tombstones XML File**. Just click **Cancel** in both of these windows.
4. On successful completion of the retrieval, click **Close** on the message box that appears, or if errors occurred, click **View Log** to troubleshoot them.
5. Click **SmartPlant > To Do List**.
IMPORTANT If using fieldbus tags, after retrieving the Yokogawa data, but before running any tasks from the To Do List, you must make associations between Foundation Fieldbus device types, instrument manufacturers, and SmartPlant Instrumentation instrument types. For more information, see *Associate Device Types for DCS Vendors* (on page 396).
6. In the **To Do List** window, select the tasks that you want to run.
TIP For more details of available options when running tasks, see *Run Tasks from the To Do List* (on page 504).
7. On the **To Do List** toolbar, click **Run Task** .

See Also

View the Log File for a DCS Vendor (on page 397)

Publish Data for Yokogawa CENTUM CS 3000

IMPORTANT Spaces are not allowed in Yokogawa CENTUM CS 3000 tags, therefore, when publishing data, SmartPlant Instrumentation removes spaces in instrument and Control System tags. You can specify a substitute character, such as an underscore, to replace the spaces; to do so, you must add the following line in the Intools.ini file under the [API] section:
NameSpacesReplacement = "_".

1. In any SmartPlant Instrumentation module, click **Tools > Interfaces > Yokogawa CENTUM CS 3000**.
2. On the **Yokogawa CENTUM CS 3000 Interface** dialog box, under **Data transfer mode**, click **Publish SmartPlant Instrumentation data**, and then click **OK**.
TIP If prompted to enable item registry (even though your System Administrator has already activated this option as required), contact SmartPlant Instrumentation support.
3. On the **Plant Panel Selection** dialog box, do one of the following:

- To publish all relevant database fields for Yokogawa CENTUM CS 3000, select the **Select all** check box.
 - For publishing of data associated with a given DCS panel, select the **Select** check box next to that panel.
4. On the **Publish to File** dialog box, under **Folder to save XML** files, type the path for Yokogawa CENTUM CS 3000 publishing, and click **OK** to publish the .xml file for the first DCS panel that you selected.
 5. For each additional DCS panel that you selected in the SmartPlant Instrumentation **Plant Panel Selection** dialog box, when the **Publish to File** dialog box reopens, click **OK**.

NOTE SmartPlant Instrumentation publishes the data associated with each DCS panel into a separate .xml file.

See Also

Prerequisites for Working with DCS Vendor Interfaces (on page 378)

Retrieve ABB Definitions

IMPORTANT

- Before you start this procedure, make sure that you have an Internet connection and a valid Intergraph customer user name and password.
 - SmartPlant Instrumentation is only capable of handling certain I/O types that ABB supports. For details of supported I/O card catalog definitions, contact Intergraph Support.
1. In any SmartPlant Instrumentation module, click **Tools > Interfaces > ABB**.
 2. On the **Retrieve ABB Definitions** dialog box, click **Browse**, navigate to the folder that contains the ABB files, and click **OK**.
 3. In the data window, under **Select**, select the documents that you want to retrieve in SmartPlant Instrumentation, and click **OK**.
 4. When done, click **Close**.

NOTE When retrieving ABB definitions, the software automatically adds new definitions and updates any modifications to definitions that already exist in the SmartPlant Instrumentation database. However, you must delete any redundant definitions manually from the Reference Explorer.

See Also

View the Log File for a DCS Vendor (on page 397)

Retrieve Honeywell Definitions

IMPORTANT

- Before you start this procedure, make sure that you have an Internet connection and a valid Intergraph customer user name and password.
 - SmartPlant Instrumentation is only capable of handling the following I/O types that Honeywell supports:
 - PMIO.
 - Series C IO.
 - Safety Manager IO (SM).
 - Fail Safe Controller IO (FSC).
1. In any SmartPlant Instrumentation module, click **Tools > Interfaces > Honeywell**.
 2. On the **Retrieve Honeywell Definitions** dialog box, click **Browse**, navigate to the folder to which you unzipped the files that you downloaded, and click **OK**.

3. In the data window, under **Select**, select the documents that you want to retrieve in SmartPlant Instrumentation, and click **OK**.
4. When done, click **Close**.

NOTE When retrieving Honeywell definitions, the software automatically adds new definitions and updates any modifications to definitions that already exist in the SmartPlant Instrumentation database. However, you must delete any redundant definitions manually from the **Reference Explorer**.

See Also

View the Log File for a DCS Vendor (on page 397)

General DCS Vendor Activities

You can perform the following general activities after retrieving your DCS vendor data:

- *Associate Device Types for DCS Vendors* (on page 396)
- *View the Log File for a DCS Vendor* (on page 397)

Associate Device Types for DCS Vendors

Use this procedure to make associations between Foundation Fieldbus and HART device types, instrument manufacturers, and SmartPlant Instrumentation instrument types.

IMPORTANT After you have retrieved data from your DCS vendor interface, you can determine the manufacturer and device type of each Foundation Fieldbus device that you need to associate with a SmartPlant Instrumentation instrument type. To do so, display the **To Do List** window and double-click a fieldbus device. On the **Details** tab, the value of the **MFR COMPANY IDENTIFICATION** property corresponds to the manufacturer's identification number. This number appears in parentheses beside the name of the manufacturer in the **Tree View** pane of the **Associate Foundation Fieldbus Device Types with Instrument Type** dialog box. The value of the **FieldBus Device ID** task property corresponds to the number in the **Device Type** column on the **Details** pane of the **Associate Foundation Fieldbus Device Types with Instrument Type** dialog box. The adjacent **Device Type Description** column assists you in selecting the appropriate instrument type to associate.

1. Click **Tools > Interfaces > Associate Foundation Fieldbus Device Types**.
2. In the **Tree View** pane, click  to expand the **Certified Fieldbus Instruments** list and display the available manufacturers.
3. Do one of the following:
 - Select a manufacturer to view details of all the device types available for that manufacturer.
 - For a particular manufacturer, click  and select a device type to view its details.
4. In the **Details** pane, select the desired device type and click **Associate**.
5. In the **Instrument Types** dialog box, do one of the following:
 - Select an existing fieldbus instrument type for which the **I/O type** value is **Fieldbus**, for association with the current device type. You can check the I/O type by viewing the profile of the instrument type.
 - Create a new fieldbus instrument type or edit an existing one. For details, see *Define Foundation Fieldbus and Profibus Instrument Type Profiles*.

IMPORTANT When you create fieldbus tags that are compatible with the DCS vendor, the only acceptable values for instrument type are those that you associated with device types for that vendor during the downloading process.

6. Click **OK** to associate the selected instrument type with the current device type and close the **Instrument Types** dialog box.

IMPORTANT

- When you create a fieldbus tag based on the displayed instrument type, the only acceptable values for the manufacturer are those displayed in this dialog box. If you select other manufacturers, this will prevent validation in the DCS vendor's database.
- You can associate only one function block for each device type with a particular instrument type.

7. When done, click **OK**.

NOTES

- For general guidelines regarding fieldbus devices, see Foundation Fieldbus Design: An Overview and Profibus Design.
- For details of how to create fieldbus devices, see Create Foundation Fieldbus and Profibus Instruments.

View the Log File for a DCS Vendor

NOTE After you retrieve item definition documents from a DCS vendor into SmartPlant Instrumentation, you can use this procedure to view and save the log. You can then open the .txt file in a word processor or text editor and print it.

1. On the appropriate DCS vendor dialog box, for example, **Retrieve Yokogawa - CENTUM CS 3000 Definitions**, click **View Log**.
2. On the **Log** dialog box, view the log.
3. To save the log as a .txt file, click **Save**.
4. On the **Select File** dialog box, navigate to the desired folder and type a file name.
5. Click **Save**.

FirstVue Interface

The FirstVue interface allows you to exchange control valve data between SmartPlant Instrumentation and the Fisher- Rosemount FirstVue application using ASCII delimited .csv files. After exporting your control valve data from SmartPlant Instrumentation and performing all the desired calculations in FirstVue, you can import the calculation results back to SmartPlant Instrumentation where this data can be used in specification sheets, reports, and other SmartPlant Instrumentation features such as browsers. You can also print out the information as a standard ISA specification, the same way as you do it in FirstVue.

The FirstVue interface supports the Fisher-Rosemount FirstVue application fields and field order, so importing calculation results from FirstVue to SmartPlant Instrumentation automatically updates fields that you require.

Flow of Activities for Working with FirstVue

1. Define a file or database with the data you want to import. For details about supported data sources, see Database Platform Support.
2. Export control valve data from SmartPlant Instrumentation to an ASCII file. For details, see:
 - *Prerequisites for Exporting Data to FirstVue* (on page 399)
 - *Exporting FirstVue Data* (on page 400)
3. Run FirstVue and do the following:
 - a. Import the SmartPlant Instrumentation control valve data from the ASCII file.
 - b. Calculate and select the appropriate control valve in FirstVue.
 - c. Export the sizing data from FirstVue to an ASCII file.

For details, see your *FirstVue User's Guide*.
4. In the Import Utility, run the FirstVue import links to import FirstVue sizing data.

TIP The import links are retrieved from the In_ctlog.db file and are used to import sizing data from the ASCII files to the SmartPlant Instrumentation database. For details, see:

 - *Prerequisites for Importing FirstVue Data* (on page 401)
 - *Importing FirstVue Data* (on page 402)
5. View and edit the imported sizing data, if required.

FirstVue Field Conversion Conventions

The following items describe the conversion conventions used by the SmartPlant Instrumentation FirstVue interface when transferring data from SmartPlant Instrumentation to FirstVue and back.

1. For outlet line parameters, SmartPlant Instrumentation uses specification custom fields.
2. When exporting line data to ASCII delimited files, SmartPlant Instrumentation uses the same values for outlet line parameters as for input line parameters if the following FirstVue fields contain a null value:
 - **pipeoutletdiameter**
 - **outpipelinesize**
 - **outpipelinesched**
3. For the **otherconditionname** FirstVue field, SmartPlant Instrumentation automatically assigns the constant value: **Shut-Off**.
4. When importing new line data, make sure the **ansi_din** SmartPlant Instrumentation field data complies with the following convention:
 - If the **pipelineuom** FirstVue field value is in (inches), set the **ansi_din** field to **A**.
 - If the **pipelineuom** field value is mm, set the **ansi_din** field to **D**.
5. The following SmartPlant Instrumentation-to-FirstVue fluid phase relations apply:

SmartPlant Instrumentation (pd_fluid_phase field)	FirstVue (fluidstate field)
L	Liquid
W	Water
G	Gas
S	Vapor

NOTES

- The source text file profile is defined in the `odbc.ini` registry folder.
- When you install SmartPlant Instrumentation, you can also install the predefined ASCII file profile for use with FirstVue.
- You **must** define your own Microsoft driver using the Windows **ODBC Data Source Administrator**.
- When defining a profile for FirstVue data, make sure you use a comma delimiter and the **Column Names** option.

CAUTION

If you change an instrument type that was exported from SmartPlant Instrumentation in the FirstVue interface before re-importing it to SmartPlant Instrumentation, the new instrument type will be created in SmartPlant Instrumentation. You can avoid this by modifying the appropriate FirstVue import links.

See Also

Prerequisites for Importing FirstVue Data (on page 401)

Prerequisites for Exporting Data to FirstVue

IMPORTANT

Before being able to export data, the predefined import links for FirstVue must be available. To make the links available, you need to import the appropriate system interfaces into SmartPlant Instrumentation from the Administration module (for details, see *Import System Interfaces* (on page 349)).

Before you start exporting data, you need to enter the required process data (for example, Tag Name and Service) in the appropriate process data sheets. Your choice of the process data parameter values will determine your subsequent selections of the valve sizing data such as **Body Material** and **Bonnet**.

At this stage, you can also define process data parameters specific to the selected control valve (for example, Leakage). (These parameters can be viewed in the **Additional Properties** window in the Process Data module.)

Also, consider the following issues:

- When exporting data to FirstVue, the SmartPlant Instrumentation export feature automatically converts the SmartPlant Instrumentation system and unit of measure codes to the appropriate system and unit of measure codes used in FirstVue, for example: °C in SmartPlant Instrumentation is converted to **deg C** in FirstVue. However, since SmartPlant Instrumentation contains additional units of measure, some SmartPlant Instrumentation units of measure may not have parallel values in FirstVue and therefore will not be accessible in FirstVue for sizing calculations. In this case an appropriate message is displayed and a note is added in the `Error.log` file (located in the same folder where you saved the ASCII file).
- Fields in SmartPlant Instrumentation and in FirstVue differ in length and SmartPlant Instrumentation fields may be truncated if longer than the corresponding fields in FirstVue. Therefore, you need to make sure that the truncated data does not contain sizing data which is required in FirstVue.

Exporting FirstVue Data

You export SmartPlant Instrumentation process and calculation data to an ASCII command delimited file by using the SmartPlant Instrumentation export feature. This ASCII file contains the following information:

- Fields that are required for sizing calculations, including line data
- ISA format specification fields
- Fields that contain export-only data (for example, revision data)
- Fields that allow insertion of new data, when you import data from the ASCII file back to SmartPlant Instrumentation

NOTE During the export process, the 'U' character is added to the FirstVue **unitnumber** field string.

Export FirstVue Data

IMPORTANT Before using this procedure, make sure you meet all the prerequisites. For details, see *Prerequisites for Exporting Data to FirstVue* (on page 399).

1. Open the SmartPlant Instrumentation Instrument Index module.
2. Do one of the following to open an Instrument Index Standard Browser view:
 - Click .
 - Click **Actions > Browse Index**.
3. In the browser view, select the tags whose control valve data you want to export to FirstVue. To select more than one tag, hold down either the **Ctrl** key or the **Shift** key and click the desired fields.
4. Click **Tools > Interfaces > Fisher FirstVue**.
5. On the **Export to FirstVue** dialog box, enter data as follows:
 - a. To select the appropriate FirstVue ASCII file with a .csv extension to which the SmartPlant Instrumentation control valve data will be exported, do one of the following:
 - In the **File** text box, type in the path and location of the FirstVue export file name.
 - Click **Browse** to navigate to the FirstVue file location.
 - b. If you selected in the previous step to export to an existing ASCII file, do one of the following:
 - Select the **Overwrite** check box to overwrite the existing ASCII file.
 - Clear the **Overwrite** check box to keep the existing ASCII file. In this case, if you enter an **existing** file in the **File Name** data field, you will be prompted to confirm the overwrite.
 - c. To select the level on which you want to export the SmartPlant Instrumentation data to FirstVue, do one of the following:
 - Click **Plant** to export all the control valve tags and their data belonging to the current plant.
 - Click **Unit** to export all the control valve tags and their data belonging to the current unit.
 - Click **Filter** to export only the control valve tags and their data that comply with the filter parameters that you have set for the current Instrument Index Standard Browser view.
 - Click **Selected tags** to export only the tags and their data that you selected in the Instrument Index Standard Browser view (see step 3 in this procedure).

CAUTION If you select to export selected tags, make sure you select the appropriate tags before clicking **OK** on the **Export to FirstVue** dialog box.

- d. Under **Use field length from**, do one of the following:
 - Click **SmartPlant Instrumentation** to truncate the exported fields to match the lengths indicated in the SmartPlant Instrumentation database.
 - Click **FirstVue** to truncate the exported fields to match the lengths indicated in the FirstVue field table.
 6. Click **OK** to start the export process.
- TIP** If the export process is successful, an appropriate message is displayed, notifying you that the Log file is empty.
- CAUTION** Failing to convert units of measure will generate an error message. This means that the associated data was exported without the required units of measure (that is, the unit of measure fields in FirstVue will be empty). In this case, you should select the desired units of measure manually in FirstVue.
7. On completion of the export process, click **Log File** to open the Export.log file, located in the same folder where you exported the ASCII file, where you can view any errors that occurred during the export process.
 8. Click **Close** to close the **Export to FirstVue** dialog box and return to the browser view.

Prerequisites for Importing FirstVue Data

This topic lists and describes all the prerequisites you must meet before importing FirstVue data into SmartPlant Instrumentation. In addition to FirstVue-specific prerequisites, make sure you have configured your ODBC data source (see *Configure ODBC Data Source for DBF Files*) and that you have completed the general prerequisites (for details, see *General Import Prerequisites*).

IMPORTANT Before being able to import data, the predefined import links for FirstVue must be available. To make the links available, you need to import the appropriate system interfaces into SmartPlant Instrumentation from the Administration module (for details, see *Import System Interfaces* (on page 349)).

- Prepare a source ASCII file with a .csv extension. Make sure that the following requirements are met for this file:
 - FirstVue data fields (for example, **actuatorsize**, **minbenchrange**, **maxbenchrange**, and so forth) should not contain any periods ('.').
 - In FirstVue, when using the **User Overrides** option for the ISA_PM spec form, the following fields must be numeric.
 - ISA line 10 - Maximum, Normal, and Minimum Travel
 - ISA line 11 - Maximum, Normal, and Minimum Predicted SPL
 - ISA line 18 - Maximum Pressure and Temperature
 - ISA line 36 - Trim Rated CV
 - The **valvemfr** FirstVue field must contain the appropriate manufacturer name (the FirstVue export process will set the value of this field to FISHER by default if it is empty).

IMPORTANT Also note the following:

- Make sure that your ODBC profile is named VUE1. For details on how to define a new ODBC profile, see *Configure ODBC Data Source for Text Files*.
- Due to the Unicode technology, check the system codes and make sure that you have correctly adapted all the system codes and the units of measure. For details, see *System Codes*.

- Prior to running your import link, make sure that you have selected the appropriate source system. In Import Manager, click **Code > Source System List** and then select the source system that you require.
- For all the import links that contain references to the Control Valve table, note that the Control Valve table has two fields that deal with similar data, CV_VALVE_TYPE and CV_VALVE_TYPE_ID. Both of these fields are supported by the Specifications module. However, only the CV_VALVE_TYPE_ID field is used in the Calculations module. Therefore, if you want the imported control valve data to be linked to calculations, make sure that you map the CV_VALVE_TYPE_ID field in the appropriate import links. Note that there is no system code adaptation for this field since this field is referenced from another table.

Importing FirstVue Data

You can import FirstVue sizing and specification data into SmartPlant Instrumentation from a source ASCII delimited file with a .csv extension. After the Domain Administrator imports FirstVue link groups from the In_ctlog.db file using the **Administration** module options, this group appears in the **Link Explorer** in the Import Utility. The links in the FirstVue group have predefined mapping which you may need to modify as you require. You cannot change the import method or table/module assignment of these links. It is possible to restore deleted FirstVue links by re-importing the link group from the In_ctlog.db file. Note, however, that to restore deleted links, you must first rename the FirstVue group or delete the entire group.

Also, when retrieving the FirstVue link group from the In_ctlog.db file, the software also retrieves the system codes and unit of measure codes. These codes are already adapted to SmartPlant Instrumentation, that is, every source code value in FirstVue is associated with its appropriate target value in SmartPlant Instrumentation.

It is possible to run all the FirstVue group links automatically in order of their appearance. Advanced users can perform a manual import process which allows you to carry out a step- by-step procedure. Importing data this way enables you to view and modify the default import parameters and link settings.

The following links are available in the FirstVue link group the Domain Administrator imported from the In_ctlog.db file:

- **FirstVue - Index** — Contains the appropriate sizing data for importing into the Instrument Index module, including the UDF_COMPONENT table columns.
- **FirstVue - PD/Calcs** — Contains the appropriate sizing data for importing into the Process Data module.
- **Specification Data** — Is used for specification data import into the SPEC_SHEET_DATA table.
- **Specification Data 0** — Is used for specification data import into the ADD_SPEC1 table.

See Also

Prerequisites for Importing FirstVue Data (on page 401)

Import FirstVue Data Automatically

Use this procedure to import FirstVue data without updating the mapping in the import links.

IMPORTANT

- Before using this procedure, make sure you meet all the prerequisites. For details, see *Prerequisites for Importing FirstVue Data* (on page 401).
 - When importing FirstVue data, you must always use the FirstVue interface to connect to the source data files before you can run the links from the **Link Explorer**. You cannot create and run links outside of the interface.
1. Do one of the following:
 - On the **Link Explorer** menu bar, click .
 - Click **Options > Fisher FirstVue**.
 2. Beside the **Source file** box, click **Browse** and select a .csv ASCII file containing data exported from FirstVue.
 3. Click **Open** to display the file path in the **Source file** box.
 4. Do one of the following:
 - Select **Insert new data** if you are importing FirstVue data into SmartPlant Instrumentation for the very first time.
 - Clear **Insert new data** If you previously imported FirstVue data into SmartPlant Instrumentation and you only need to update the existing sizing data in the target database.
 5. Select **Run link group automatically** and click **OK** to minimize the **Fisher FirstVue** window.
 6. On the **Select Link Group** dialog box, select **FirstVue** and click **OK** to start the import.
 7. If notified that the link requires system codes, click **OK** in the message box, and then, do the following:
 - a. On the **Source System List** dialog box, which opens automatically, select the **FirstVue** system codes, which the Domain Administrator imported from the In_ctlog.db file.
 - b. Click **OK** to continue the import process.
- TIP** When running the first import session, the software prompts you to select the source system codes because, for each FirstVue import link, on the **Source** tab of the **Link Properties** dialog box, the **Use system codes** check box is selected.
8. Open SmartPlant Instrumentation and examine the imported data in the Browser, Process Data, or Instrument Index module.

Import FirstVue Data Manually

Use this procedure as an example if you need to modify the mapping in FirstVue links before importing FirstVue data.

IMPORTANT

- Before using this procedure, make sure you meet all the prerequisites. For details, see *Prerequisites for Importing FirstVue Data* (on page 401).
- When importing FirstVue data, you must always use the FirstVue interface to connect to the source data files before you can run the links from the **Link Explorer**. You cannot create and run links outside of the interface.

1. Do one of the following:
 - On the **Link Explorer** menu bar, click .
 - Click **Options > Fisher FirstVue**.
2. Beside the **Source file** box, click **Browse** and select a .csv ASCII file containing data exported from FirstVue.
3. Click **Open** to display the file path in the **Source file** box.
4. Do one of the following:
 - Select **Insert new data** if you are importing FirstVue data into SmartPlant Instrumentation for the very first time.
 - Clear **Insert new data** If you previously imported FirstVue data into SmartPlant Instrumentation and you only need to update the existing sizing data in the target database.
5. Clear **Run link group automatically**.
6. Click **OK** to minimize the **Fisher FirstVue** window.
7. In the **Link Explorer**, in the **FirstVue** group, select and open the link **FirstVue - PD/Calcs** in the **Import Link** window.
8. Modify the displayed mapping as follows:
 - a. Map the source **fluidstate** field to the **Fluid State** field in the PD_GENERAL table.
 - b. Select the **Code** check box next to the **Fluid State** field to use code adaptation when importing data to this field.
 - c. Map the following source FirstVue fields with the appropriate target SmartPlant Instrumentation fields:

Link	Source Field	Target Field
All	plantname	Change if required
All	areaname	Change if required
All	unitnumber	Change if required
All	itemtag	Check whether the tag instrument convention in each target unit matches the source data
Specification Data	specformnumber	SPEC_FORM_CNUM/SPEC_FORM_ID

9. If the control valve in SmartPlant Instrumentation does not have a specification or if the control valve specification is not an ISA sheet, do one of the following:
 - If the tag does not have a specification, set the value of the **specformnumber** field to **70**, which is the form number of the library form **ISA Control Valve**.
 - If the control valve specification is not an ISA sheet, in the **FirstVue - Index** import link, replace the sources for the additional fields as required and in the **Specification Data** import link, set the value of the **specformnumber** field to the required form number.
10. Start the import process by clicking  in the **Import Link** window.
11. If notified that the link requires system codes, click **OK** in the message box, and then, do the following:
 - a. On the **Source System List** dialog box, which opens automatically, select the **FirstVue** system codes, which the Domain Administrator imported from the In_ctlog.db file.
 - b. Click **OK** to continue the import process.

TIP When running the first import session, the software prompts you to select the source system codes because, for each FirstVue import link, on the **Source** tab of the **Link Properties** dialog box, the **Use system codes** check box is selected.

12. Open SmartPlant Instrumentation and examine the imported data in the Browser, Process Data, or Instrument Index module.

See Also

Importing FirstVue Data (on page 402)

Fisher FIRSTVUE Dialog Box

This dialog box allows you to update the SmartPlant Instrumentation database with data from FIRSTVUE ASCII files.

Source file — Type the path and filename of the file where you saved the control valve data or click **Browse** to navigate to the required file.

Insert new data — Select this check box to enable new data insertion during the import process. Clearing the check box results in the rejection of all new source (FIRSTVUE) tags during the import process. It is recommended that you select this check box if you want to import new FIRSTVUE sizing data that was not previously exported from SmartPlant Instrumentation.

Run link group automatically — Select this option to run the links in the FIRSTVUE group automatically without displaying the links in the **Import Link** window after clicking **OK**.

Masoneilan ValSpeQ Interface

The Masoneilan ValSpeQ interface allows you to exchange control valve process and sizing data between SmartPlant Instrumentation and the Masoneilan ValSpeQ application using ASCII delimited .csv files. After exporting your control valve data from SmartPlant Instrumentation and performing all the desired calculations in Masoneilan ValSpeQ, you can import the calculation results back to SmartPlant Instrumentation where this data can be used in process data and specification sheets, reports, and other SmartPlant Instrumentation features such as browsers. You can also print out the information from SmartPlant Instrumentation as well as from Masoneilan ValSpeQ.

Flow of Activities for Working with Masoneilan ValSpeQ

1. Define a file or database with the data you want to import. For details about supported data sources, see Database Platform Support.
2. Export control valve data from SmartPlant Instrumentation to an ASCII file. For details, see:
 - *Prerequisites for Exporting Data to Masoneilan ValSpeQ* (on page 406)
 - *Exporting Masoneilan ValSpeQ Data* (on page 406)
3. Run Masoneilan ValSpeQ and do the following:
 - a. Import the SmartPlant Instrumentation control valve data from the ASCII file
 - b. Calculate and select the appropriate control valve in Masoneilan ValSpeQ
 - c. Export the sizing data from Masoneilan ValSpeQ to an ASCII file

For details, see your *Masoneilan ValSpeQ User's Guide*.
4. In the Import Utility, run the Masoneilan ValSpeQ import links to import Masoneilan ValSpeQ sizing data.

TIP The import links are retrieved from the In_ctlog.db file and are used to import sizing data from the ASCII files to the SmartPlant Instrumentation database. For details, see:

- *Prerequisites for Importing Masoneilan ValSpeQ Data* (on page 408)
 - *Importing Masoneilan ValSpeQ Data* (on page 409)
5. View and edit the imported sizing data, if required.

Prerequisites for Exporting Data to Masoneilan ValSpeQ

IMPORTANT Before being able to export data, the predefined import links for Masoneilan ValSpeQ must be available. To make the links available, you need to import the appropriate system interfaces into SmartPlant Instrumentation from the Administration module (for details, see *Import System Interfaces* (on page 349)).

Before you start exporting data, you need to enter the required process data (for example, Tag Name and Service) in the appropriate process data sheets. Your choice of the process data parameter values will determine your subsequent selections of the valve sizing data such as **Body Size** and **Rated Cv**.

At this stage, you can also define process data parameters specific to the selected control valve (for example, Leakage). (These parameters can be viewed in the **Additional Properties** window in the Process Data module.)

Also, consider the following issues:

- When exporting data to Masoneilan ValSpeQ, the SmartPlant Instrumentation export feature automatically converts the SmartPlant Instrumentation system and unit of measure codes to the appropriate system and unit of measure codes used in Masoneilan ValSpeQ, for example: °C in SmartPlant Instrumentation is converted to deg C in Masoneilan ValSpeQ. However, since SmartPlant Instrumentation contains additional units of measure, some SmartPlant Instrumentation units of measure may not have parallel values in Masoneilan ValSpeQ and therefore will not be accessible in Masoneilan ValSpeQ for sizing calculations. In this case an appropriate message is displayed and a note is added in the Error.log file (located in the same folder where you saved the ASCII file).
- Fields in SmartPlant Instrumentation and in Masoneilan ValSpeQ differ in length and SmartPlant Instrumentation fields may be truncated if longer than the corresponding fields in Masoneilan ValSpeQ. Therefore, you need to make sure that the truncated data does not contain sizing data which is required in Masoneilan ValSpeQ.
- When exporting vapor pressure or critical pressure values, you must specify the units of measure of these quantities as absolute (A) and not gage (G) in the specification sheet.

Exporting Masoneilan ValSpeQ Data

You export SmartPlant Instrumentation process and calculation data to an ASCII command delimited file by using the SmartPlant Instrumentation export feature. This file can later be imported into Masoneilan ValSpeQ where the data it contains is used to make sizing calculations and to select the appropriate valves. The ASCII file contains the following information:

- Fields that are required for sizing calculations, including line data
- ISA format specification fields
- Fields that contain export-only data (for example, revision data)
- Fields that allow insertion of new data, when you import data from the ASCII file back to SmartPlant Instrumentation

NOTE During the export process, the 'U' character is added to the Masoneilan ValSpeQ **unitnumber** field string.

Export Masoneilan ValSpeQ Data

IMPORTANT Before using this procedure, make sure you meet all the prerequisites. For details, see *Prerequisites for Exporting Data to Masoneilan ValSpeQ* (on page 406).

1. Open the SmartPlant Instrumentation Instrument Index module.
 2. Do one of the following to open an Instrument Index Standard Browser view:
 - Click .
 - Click **Actions > Browse Index**.
 3. In the browser view, select the tags whose control valve data you want to export to Masoneilan ValSpeQ. To select more than one tag, hold down either the **Ctrl** key or the **Shift** key and click the desired fields.
 4. Click **Tools > Interfaces > Masoneilan ValSpeQ**.
 5. On the **Export to Masoneilan ValSpeQ** dialog box, enter data as follows:
 - a. To select the appropriate Masoneilan ValSpeQ ASCII file with a .csv extension to which the SmartPlant Instrumentation control valve data will be exported, do one of the following:
 - In the **File** text box, type in the path and location of the Masoneilan ValSpeQ export file name.
 - Click **Browse** to navigate to the Masoneilan ValSpeQ file location.
 - b. If you selected in the previous step to export to an existing ASCII file, do one of the following:
 - Select the **Overwrite** check box to overwrite the existing ASCII file.
 - Clear the **Overwrite** check box to keep the existing ASCII file. In this case, if you enter an **existing** file in the **File Name** data field, you will be prompted to confirm the overwrite.
 - c. Under **Export for**, select the desired specification to be used for the exported data, from either:
 - Spec#1
 - Spec#75
 - d. To select the level on which you want to export the SmartPlant Instrumentation data to Masoneilan ValSpeQ, do one of the following:
 - Click **Plant** to export all the control valve tags and their data belonging to the current plant.
 - Click **Unit** to export all the control valve tags and their data belonging to the current unit.
 - Click **Filter** to export only the control valve tags and their data that comply with the filter parameters that you have set for the current Instrument Index Standard Browser view.
 - Click **Selected tags** to export only the tags and their data that you selected in the Instrument Index Standard Browser view (see step 3 in this procedure).
- CAUTION** If you select to export selected tags, make sure you select the appropriate tags before clicking **OK** on the **Export to Masoneilan ValSpeQ** dialog box.
- e. Under **Use field length from**, do one of the following:
 - Click **SmartPlant Instrumentation** to truncate the exported fields to match the lengths indicated in the SmartPlant Instrumentation database.

- Click **Masoneilan** to truncate the exported fields to match the lengths indicated in the Masoneilan field table.
- 6. Click **OK** to start the export process.
 - TIP** If the export process is successful, an appropriate message is displayed, notifying you that the Log file is empty.
 - CAUTION** Failing to convert units of measure will generate an error message. This means that the associated data was exported without the required units of measure (that is, the unit of measure fields in Masoneilan ValSpeQ will be empty). In this case, you should select the desired units of measure manually in Masoneilan ValSpeQ.
- 7. On completion of the export process, click **Log File** to open the Export.log file, located in the same folder where you exported the ASCII file, where you can view any errors that occurred during the export process.
- 8. Click **Close** to close the **Export to Masoneilan ValSpeQ** dialog box and return to the browser view.

Prerequisites for Importing Masoneilan ValSpeQ Data

This topic lists and describes all the prerequisites you must meet before importing Masoneilan ValSpeQ data into SmartPlant Instrumentation. In addition to Masoneilan-specific prerequisites, make sure you have configured your ODBC data source (see *Configure ODBC Data Source for DBF Files*) and that you have completed the general prerequisites (for details, see *General Import Prerequisites*).

IMPORTANT Before being able to import data, the predefined import links for Masoneilan ValSpeQ must be available. To make the links available, you need to import the appropriate system interfaces into SmartPlant Instrumentation from the Administration module (for details, see *Import System Interfaces* (on page 349)).

Ensure that you have performed the following prerequisite actions:

- Create target instruments with **Control Valve** as the instrument type, assign process data sheets to these instruments, and make sure you clear the process data in these sheets.
- In the Specifications module, restore the library form **75 Masoneilan Control Valve**. For details see *Restore Library Forms* (on page 228). Masoneilan data that you import will appear in control valve specifications based either on form 75 or form 1, which you do not need to restore.
- For forms 1 and 75, prepare source ASCII files with .csv extensions and name them as desired. The Import Utility uses these files to identify the Masoneilan import source for control valve specifications based on the appropriate forms.

IMPORTANT Also note the following:

- Make sure that your ODBC profile is named VUE1. For details on how to define a new ODBC profile, see *Configure ODBC Data Source for Text Files*.
- Due to the Unicode technology, check the system codes and make sure that you have correctly adapted all the system codes and the units of measure. For details, see *System Codes*.
- Prior to running your import link, make sure that you have selected the appropriate source system. In Import Manager, click **Code > Source System List** and then select the source system that you require.

- For all the import links that contain references to the Control Valve table, note that the Control Valve table has two fields that deal with similar data, CV_VALVE_TYPE and CV_VALVE_TYPE_ID. Both of these fields are supported by the Specifications module. However, only the CV_VALVE_TYPE_ID field is used in the Calculations module. Therefore, if you want the imported control valve data to be linked to calculations, make sure that you map the CV_VALVE_TYPE_ID field in the appropriate import links. Note that there is no system code adaptation for this field since this field is referenced from another table.

Importing Masoneilan ValSpeQ Data

The Masoneilan ValSpeQ interface enables you to import data for Masoneilan control valves. After the Domain Administrator imports four Masoneilan ValSpeQ link groups from the In_ctlog.db file using the **Administration** module options, the groups appear in the **Link Explorer** in the Import Utility. These links have predefined mapping which you may need to modify as you require. You cannot change the import method or table/module assignment of these links. It is possible to restore deleted Masoneilan links by re-importing the link group from the In_ctlog.db file. Note, however, that to restore deleted links, you must first rename the Masoneilan links or group or delete the entire group.

Also, when retrieving the Masoneilan link group from the In_ctlog.db file, the software also retrieves the system codes and unit of measure codes. These codes are already adapted to SmartPlant Instrumentation, that is, every source code value in Masoneilan is associated with its appropriate target value in SmartPlant Instrumentation.

SmartPlant Instrumentation features a standard ISA form which you can use to print out sizing data imported from Masoneilan ValSpeQ as an ISA specification. This specification is based on library form 75. The specification printout is identical to the one generated by Masoneilan ValSpeQ, yet retains the SmartPlant Instrumentation revision system. Alternatively, you can use library form 1.

It is possible to run all the Masoneilan group links automatically in order of their appearance. Advanced users can perform a manual import process which allows you to carry out a step-by-step procedure. Importing data this way enables you to view and modify the default import parameters and link settings.

The following links are available in the link Masoneilan ValSpeQ link groups retrieved from the In_ctlog.db file:

- **Masoneilan1 or Masoneilan75 - per module - Index** — Allows you to import data into the Instrument Index module, including the UDF_COMPONENT table, for specifications based on Form 1 or 75.
- **Masoneilan1 or Masoneilan75 - per table - Control Valve Specific Data** — Allows you to import data into the CONTROL_VALVE table for specifications based on Form 1 or 71.
- **Masoneilan1 or Masoneilan75 - per table - Control Valve General Data** — Allows you to import data into the PD_GENERAL table.
- **Masoneilan1 or Masoneilan75 - per table - Add Spec 1** — Allows you to import data into the ADD_SPEC1 table.

See Also

Prerequisites for Importing Masoneilan ValSpeQ Data (on page 408)

Import Masoneilan ValSpeQ Data

Use this procedure to import Masoneilan ValSpeQ sizing and specification data from the ASCII file you previously exported from Masoneilan ValSpeQ. You can use this procedure when importing Masoneilan ValSpeQ data whether for the first time or after a previous import.

IMPORTANT

- Before using this procedure, make sure you meet all the prerequisites. For details, see *Prerequisites for Importing Masoneilan ValSpeQ Data* (on page 408).
 - When importing Masoneilan ValSpeQ data, you must always use the Masoneilan interface to connect to the source data files before you can run the links from the **Link Explorer**. You cannot create and run links outside of the interface.
1. Do one of the following:
 - On the **Link Explorer** menu bar, click the **Masoneilan** button.
 - Click **Options > Masoneilan**.
 2. On the **Masoneilan** dialog box, do one of the following:
 - If you want to import data to control valve specifications based on standard form 1 only, beside **Source file for Spec #1**, click **Browse** and select the .csv ASCII file containing the appropriate data exported from Masoneilan.
 - If you want to import data to control valve specifications based on special form 75 only, **Source file for Spec #75**, click **Browse** and select the .csv ASCII file containing the appropriate data exported from Masoneilan.
 - If you want to import data to control valve specifications based on forms 1 and 75, specify both source files.
- TIP** Spec form 75 is a SmartPlant Instrumentation library form designed for printing out control valve data imported from Masoneilan ValSpeQ as an ISA specification. The specification printout is identical to the one generated by Masoneilan, yet retains the SmartPlant Instrumentation revision system.
3. Click **Open** to display the file name and path on the **Masoneilan** dialog box.
 4. Do one of the following:
 - If you are importing Masoneilan ValSpeQ data into SmartPlant Instrumentation for the very first time, select **Insert new data**.
 - If you previously imported Masoneilan ValSpeQ data into SmartPlant Instrumentation and you only need to update the existing sizing data in the target database, clear **Insert new data**.
 5. Do one of the following:
 - Select **Run link group automatically** to select a particular link group and run all the links in it automatically.
 - Clear **Run link group automatically** if you need to modify any of the links before importing the data.
 6. On the **Masoneilan** dialog box, click **OK**.
 7. Do one of the following:
 - If you selected **Run link group automatically**, on the **Select Link Group** dialog box, which opens automatically, select the appropriate group of Masoneilan ValSpeQ links and click OK to start the import process.

- If you cleared **Run link group automatically**, after the **Masoneilan** dialog box minimizes, open the appropriate link in the **Import Link** window and then modify the field mapping as you require. Then, start the import process by clicking  in the **Import Link** window.
8. If notified that the link requires system codes, click **OK** in the message box, and then, do the following:
 - a. On the **Source System List** dialog box, which opens automatically, select the **Masoneilan** system codes, which the Domain Administrator imported from the In_ctlog.db file.
 - b. Click **OK** to continue the import process.

TIP When running the first import session, the software prompts you to select the source system codes because, for each Masoneilan ValSpeQ import link, on the **Source** tab of the **Link Properties** dialog box, the **Use system codes** check box is selected.
 9. After performing the data import, open SmartPlant Instrumentation and examine the imported data in the Instrument Index, Process Data, and Specification modules.

See Also

Importing Masoneilan ValSpeQ Data (on page 409)

Flowserve Performance! Interface

The Flowserve Performance! interface allows you to exchange control valve process and sizing data between SmartPlant Instrumentation and the Flowserve Performance! application using ASCII delimited .csv files. After exporting your control valve data from SmartPlant Instrumentation and performing all the desired calculations in Flowserve Performance!, you can import the calculation results back to SmartPlant Instrumentation where this data can be used in process data and specification sheets, reports, and other SmartPlant Instrumentation features such as browsers. You can also print out the information as a standard ISA specification, the same way as you do it in Flowserve Performance!.

Flow of Activities for Working with Flowserve Performance!

1. Define a file or database with the data you want to import. For details about supported data sources, see Database Platform Support.
2. Export control valve data from SmartPlant Instrumentation to an ASCII file. For details, see:
 - *Prerequisites for Exporting Data to Flowserve Performance!* (on page 412)
 - *Exporting Flowserve Performance! Data* (on page 412)
3. Run Flowserve Performance! and do the following:
 - a. Import the SmartPlant Instrumentation control valve data from the ASCII file
 - b. Calculate and select the appropriate control valve in Flowserve Performance!
 - c. Export the sizing data from Flowserve Performance! to an ASCII file

For details, see your *Flowserve Performance! User's Guide*.
4. In the Import Utility, run the Flowserve Performance! import links to import Flowserve Performance! sizing data.

TIP The import links are retrieved from the In_ctlog.db file and are used to import sizing data from the ASCII files to the SmartPlant Instrumentation database. For details, see:

 - *Prerequisites for Importing Flowserve Performance! Data* (on page 414)
 - *Importing Flowserve Performance! Data* (on page 415)

5. View and edit the imported sizing data, if required.

Prerequisites for Exporting Data to Flowserve Performance!

IMPORTANT Before being able to export data, the predefined import links for Flowserve Performance! must be available. To make the links available, you need to import the appropriate system interfaces into SmartPlant Instrumentation from the Administration module (for details, see *Import System Interfaces* (on page 349)).

Before you start exporting data, you need to enter the required process data (for example, Tag Name and Service) in the appropriate process data sheets. Your choice of the process data parameter values will determine your subsequent selections of the valve sizing data such as **Body Material** and **Bonnet**.

At this stage, you can also define process data parameters specific to the selected control valve (for example, Leakage). (These parameters can be viewed in the **Additional Properties** window in the Process Data module.)

Also, consider the following issues:

- When exporting data to Flowserve Performance!, the SmartPlant Instrumentation export feature automatically converts the SmartPlant Instrumentation system and unit of measure codes to the appropriate system and unit of measure codes used in Flowserve Performance!, for example: °C in SmartPlant Instrumentation is converted to deg C in Flowserve Performance!. However, since SmartPlant Instrumentation contains additional units of measure, some SmartPlant Instrumentation units of measure may not have parallel values in Flowserve Performance! and therefore will not be accessible in Flowserve Performance! for sizing calculations. In this case an appropriate message is displayed and a note is added in the Error.log file (located in the same folder where you saved the ASCII file).
- Fields in SmartPlant Instrumentation and in Flowserve Performance! differ in length and SmartPlant Instrumentation fields may be truncated if longer than the corresponding fields in Flowserve Performance!. Therefore, you need to make sure that the truncated data does not contain sizing data which is required in Flowserve Performance!.
- When exporting vapor pressure or critical pressure values, you must specify the units of measure of these quantities as absolute (A) and not gage (G) in the specification sheet.

Exporting Flowserve Performance! Data

You export SmartPlant Instrumentation process and calculation data to an ASCII command delimited file by using the SmartPlant Instrumentation export feature. This file can later be imported into Flowserve Performance! where the data it contains is used to make sizing calculations and to select the appropriate valves. The ASCII file contains the following information:

- Fields that are required for sizing calculations, including line data
- ISA format specification fields
- Fields that contain export-only data (for example, revision data)
- Fields that allow insertion of new data, when you import data from the ASCII file back to SmartPlant Instrumentation

NOTE During the export process, the 'U' character is added to the Flowserve Performance! **unitnumber** field string.

Export Flowserve Performance! Data

IMPORTANT Before using this procedure, make sure you meet all the prerequisites. For details, see *Prerequisites for Exporting Data to Flowserve Performance!* (on page 412).

1. Open the SmartPlant Instrumentation Instrument Index module.
 2. Do one of the following to open an Instrument Index Standard Browser view:
 - Click .
 - Click **Actions > Browse Index**.
 3. In the browser view, select the tags whose control valve data you want to export to Flowserve Performance!. To select more than one tag, hold down either the **Ctrl** key or the **Shift** key and click the desired fields.
 4. Click **Tools > Interfaces > Flowserve Performance!**.
 5. On the **Export to Flowserve Performance!** dialog box, enter data as follows:
 - a. To select the appropriate Flowserve Performance! ASCII file with a .csv extension to which the SmartPlant Instrumentation control valve data will be exported, do one of the following:
 - In the **File** text box, type in the path and location of the Flowserve Performance! export file name.
 - Click **Browse** to navigate to the Flowserve Performance! file location.
 - b. If you selected in the previous step to export to an existing ASCII file, do one of the following:
 - Select the **Overwrite** check box to overwrite the existing ASCII file.
 - Clear the **Overwrite** check box to keep the existing ASCII file. In this case, if you enter an **existing** file in the **File Name** data field, you will be prompted to confirm the overwrite.
 - c. Under **Export for**, select the desired specification to be used for the exported data, from either:
 - Spec#1
 - Spec#71
 - d. To select the level on which you want to export the SmartPlant Instrumentation data to Flowserve Performance!, do one of the following:
 - Click **Plant** to export all the control valve tags and their data belonging to the current plant.
 - Click **Unit** to export all the control valve tags and their data belonging to the current unit.
 - Click **Filter** to export only the control valve tags and their data that comply with the filter parameters that you have set for the current Instrument Index Standard Browser view.
 - Click **Selected tags** to export only the tags and their data that you selected in the Instrument Index Standard Browser view (see step 3 in this procedure).
- CAUTION** If you select to export selected tags, make sure you select the appropriate tags before clicking **OK** on the **Export to Flowserve Performance!** dialog box.
- e. Under **Use field length from**, do one of the following:
 - Click **SmartPlant Instrumentation** to truncate the exported fields to match the lengths indicated in the SmartPlant Instrumentation database.

- Click **Performance** to truncate the exported fields to match the lengths indicated in the Performance field table.
- 6. Click **OK** to start the export process.
 - TIP** If the export process is successful, an appropriate message is displayed, notifying you that the Log file is empty.
 - CAUTION** Failing to convert units of measure will generate an error message. This means that the associated data was exported without the required units of measure (that is, the unit of measure fields in Flowserve Performance! will be empty). In this case, you should select the desired units of measure manually in Flowserve Performance!.
- 7. On completion of the export process, click **Log File** to open the Export.log file, located in the same folder where you exported the ASCII file, where you can view any errors that occurred during the export process.
- 8. Click **Close** to close the **Export to Flowserve Performance!** dialog box and return to the browser view.

Prerequisites for Importing Flowserve Performance! Data

This topic lists and describes all the prerequisites you must meet before importing Flowserve Performance! data into SmartPlant Instrumentation. In addition to Flowserve Performance!-specific prerequisites, make sure you have configured your ODBC data source (see *Configure ODBC Data Source for DBF Files*) and that you have completed the general prerequisites (for details, see *General Import Prerequisites*).

IMPORTANT Before being able to import data, the predefined import links for Flowserve Performance! must be available. To make the links available, you need to import the appropriate system interfaces into SmartPlant Instrumentation from the Administration module (for details, see *Import System Interfaces* (on page 349)).

Ensure that you have performed the following prerequisite actions:

- Create target instruments with **Control Valve** as the instrument type, assign process data sheets to these instruments, and make sure you clear the process data in these sheets.
- In the Specifications module, restore the library form **71 Flowserve Control Valve**. For details see *Restore Library Forms* (on page 228). Flowserve Performance! data that you import will appear in control valve specifications based either on form 71 or form 1, which you do not need to restore.
- For forms 1 and 71, prepare source ASCII files with .csv extensions and name them as desired. The Import Utility uses these files to identify the Flowserve Performance! import source for control valve specifications based on the appropriate forms.
- Clear process data in process data sheets associated with the target control valves.

IMPORTANT Also note the following:

- Make sure that your ODBC profile is named VUE1. For details on how to define a new ODBC profile, see *Configure ODBC Data Source for Text Files*.
- Due to the Unicode technology, check the system codes and make sure that you have correctly adapted all the system codes and the units of measure. For details, see *System Codes*.
- Prior to running your import link, make sure that you have selected the appropriate source system. In Import Manager, click **Code > Source System List** and then select the source system that you require.

- For all the import links that contain references to the Control Valve table, note that the Control Valve table has two fields that deal with similar data, CV_VALVE_TYPE and CV_VALVE_TYPE_ID. Both of these fields are supported by the Specifications module. However, only the CV_VALVE_TYPE_ID field is used in the Calculations module. Therefore, if you want the imported control valve data to be linked to calculations, make sure that you map the CV_VALVE_TYPE_ID field in the appropriate import links. Note that there is no system code adaptation for this field since this field is referenced from another table.

Importing Flowserve Performance! Data

The Flowserve Performance! interface enables you to import valve sizing data for Flowserve-Valtek, Flowserve-Kammer, and Flowserve-Sereg control valves. After the Domain Administrator imports four Flowserve Performance! link groups from the In_ctlog.db file using the **Administration** module options, the groups appear in the **Link Explorer** in the Import Utility. These links have predefined mapping which you may need to modify as you require. You cannot change the import method or table/module assignment of these links. It is possible to restore deleted Flowserve Performance! links by re-importing the link group from the In_ctlog.db file. Note, however, that to restore deleted links, you must first rename the Flowserve Performance! links or group or delete the entire group.

Also, when retrieving the Flowserve Performance! link group from the In_ctlog.db file, the software also retrieves the system codes and unit of measure codes. These codes are already adapted to SmartPlant Instrumentation, that is, every source code value in Flowserve Performance! is associated with its appropriate target value in SmartPlant Instrumentation.

SmartPlant Instrumentation features a standard ISA form which you can use to print out sizing data imported from Flowserve Performance! as an ISA specification. This specification is based on library form 71. The specification printout is identical to the one generated by Flowserve Performance!, yet retains the SmartPlant Instrumentation revision system. Alternatively, you can use library form 1.

It is possible to run all the Flowserve Performance! group links automatically in order of their appearance. Advanced users can perform a manual import process which allows you to carry out a step-by-step procedure. Importing data this way enables you to view and modify the default import parameters and link settings.

The following links are available in the link Flowserve Performance! link groups retrieved from the In_ctlog.db file:

- **Performance1 or Performance71 - per module - Index** — Allows you to import the appropriate sizing data into the Instrument Index module, including the UDF_COMPONENT table, for specifications based on Form 1 or 71.
- **Performance1 or Performance71 - per module - PD/Calcs** — Allows you to import the appropriate sizing data into the Process Data module for specifications based on Form 1 or 71.
- **Performance1 or Performance71 - per table - Specification Data** — Allows you to import data into the SPEC_SHEET_DATA table.
- **Performance1 or Performance71 - per table - Add Spec 1** — Allows you to import data into the ADD_SPEC1 table.

Import Flowserve Performance! Data

Use this procedure to import Flowserve Performance! sizing and specification data from the ASCII file you previously exported from Flowserve Performance!. You can use this procedure when importing Flowserve Performance! data whether for the first time or after a previous import.

IMPORTANT

- Before using this procedure, make sure you meet all the prerequisites. For details, see *Prerequisites for Importing Flowserve Performance! Data* (on page 414).
- When importing Flowserve Performance! data, you must always use the Flowserve Performance! interface to connect to the source data files before you can run the links from the **Link Explorer**. You cannot create and run links outside of the interface.

1. Do one of the following:

- On the **Link Explorer** menu bar, click .
- Click **Options > Flowserve Performance**.

2. On the **Flowserve Performance** dialog box, do one of the following:

- If you want to import data to control valve specifications based on standard form 1 only, beside **Source file for Spec #1**, click **Browse** and select the .csv ASCII file containing the appropriate data exported from Flowserve Performance!.
- If you want to import data to control valve specifications based on special form 71 only, **Source file for Spec #71**, click **Browse** and select the .csv ASCII file containing the appropriate data exported from Flowserve Performance!.
- If you want to import data to control valve specifications based on forms 1 and 71, specify both source files.

TIP Spec form 71 is a SmartPlant Instrumentation library form designed for printing out sizing data imported from Flowserve Performance! as an ISA specification. The specification printout is identical to the one generated by Flowserve Performance!, yet retains the SmartPlant Instrumentation revision system.

3. Click **Open** to display the file name and path on the **Flowserve Performance** dialog box.

4. Do one of the following:

- If you are importing Flowserve Performance! data into SmartPlant Instrumentation for the very first time, select **Insert new data**.
- If you previously imported Flowserve Performance! data into SmartPlant Instrumentation and you only need to update the existing sizing data in the target database, clear **Insert new data**.

5. Do one of the following:

- Select **Run link group automatically** to select a particular link group and run all the links in it automatically.
- Clear **Run link group automatically** if you need to modify any of the links before importing the data.

6. On the **Flowserve Performance** dialog box, click **OK**.

7. Do one of the following:

- If you selected **Run link group automatically**, on the **Select Link Group** dialog box, which opens automatically, select the required group of Flowserve Performance! links and click OK to start the import process.

- If you cleared **Run link group automatically**, after the **Flowserve Performance** dialog box minimizes, open the appropriate link in the **Import Link** window and then modify the field mapping as you require. After that, start the import process by clicking  in the **Import Link** window.
8. If notified that the link requires system codes, click **OK** in the message box, and then, do the following:
 - a. On the **Source System List** dialog box, which opens automatically, select the **Performance** system codes, which the Domain Administrator imported from the In_ctlog.db file.
 - b. Click **OK** to continue the import process.
- TIP** When running the first import session, the software prompts you to select the source system codes because, for each Flowserve Performance! import link, on the **Source** tab of the **Link Properties** dialog box, the **Use system codes** check box is selected.
9. After performing the data import, open SmartPlant Instrumentation and examine the imported data in the Instrument Index, Process Data, and Specification modules.

Flowserve Performance Dialog Box

This dialog box allows you to update the SmartPlant Instrumentation database with data from Flowserve Performance files.

Select source for spec #1 — Type the path and filename of the .csv file containing the spec #1 source or click **Browse** to navigate to the .csv file.

Select source for spec #71 — Type the path and filename of the .csv file containing the spec #71 source or click **Browse** to navigate to the .csv file.

Insert new data — Select this check box to enable new data insertion during the import process. Clearing the check box results in the rejection of all new source tags during the import process.

Run link group automatically — Select this option to run the links in the groups automatically without displaying the links in the **Import Link** window after clicking **OK**.

SECTION 34

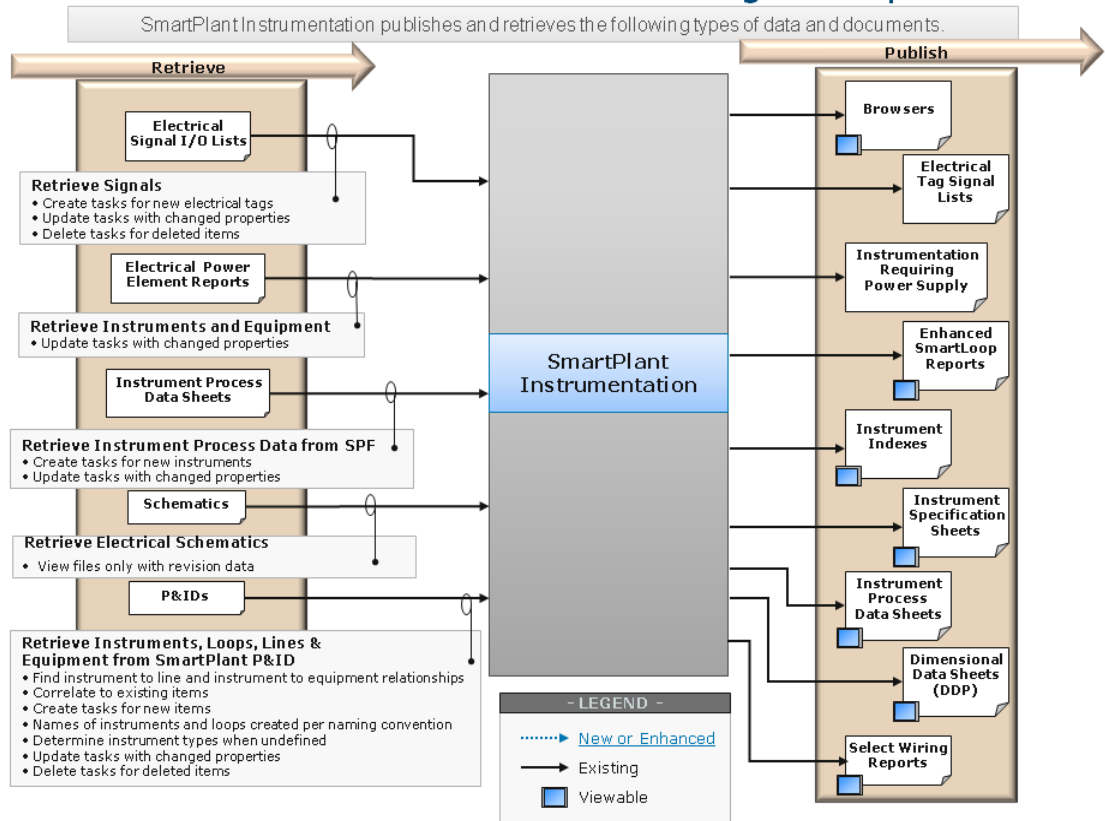
Working with SmartPlant Integration

SmartPlant integration standardizes and improves the communication among the various authoring tools you use in the course of designing, constructing, and operating a plant. SmartPlant integration manages data exchange among these authoring tools, which enables sharing and re-use of plant information throughout the plant lifecycle. SmartPlant Foundation acts as a repository for data and a medium through which information is shared among other tools, such as SmartPlant Electrical, SmartPlant P&ID, and Aspen .

Most of the commands that provide access to SmartPlant integration functionality exist in the common user interface available on the **SmartPlant** menu in SmartPlant Instrumentation.

The following graphic displays what SmartPlant Instrumentation publishes and retrieves and shows the flow of data and the different types of data.

SmartPlant Instrumentation Data Exchange Example



SmartPlant Instrumentation interacts with SmartPlant Foundation by correlating items between the plant database and the SmartPlant Foundation database, retrieving such documents as Cabinets, Electrical Signals, P&IDs, and the like from SmartPlant. Also, SmartPlant Instrumentation creates a set of tasks in the To Do List that you can run to update the plant database. In SmartPlant Instrumentation, you can also use the **SmartPlant** menu to publish documents and retrieve data, access the SmartPlant Foundation Web Portal in order to browse data, and subscribe to change notifications and compare documents.

NOTE You can only use the **SmartPlant** menu commands after your plant is registered.

Registering Tools

Before you can publish and retrieve information from any of the authoring tools, you must register each plant in SmartPlant Instrumentation with a SmartPlant Foundation database. The connection allows SmartPlant Instrumentation to use the SmartPlant integration commands. A SmartPlant Instrumentation Domain Administrator typically performs the registration.

The software maps a plant and all its projects to a single SmartPlant Foundation URL, which points to one, and only one, SmartPlant Foundation plant database and its projects. When you use the **Register** command in any of the authoring tools, you are registering an authoring tool plant with a SmartPlant Foundation URL and plant that you specify.

The Domain Administrator must register each plant in the authoring tool once; this action takes place in the Administration module. After the plant is registered, you can publish and retrieve documents.

IMPORTANT Tool registration information is not upgraded in SmartPlant Foundation; therefore, each tool must re-register with SmartPlant Foundation after upgrading SmartPlant Foundation. Since it is not possible to re-register a SmartPlant Instrumentation plant using the interface options, if you must re-register a SmartPlant Instrumentation plant, contact Intergraph Customer Support.

Access the SmartPlant Foundation Web Client

- Click **SmartPlant > Browser**.

NOTES

- This command is available only if the active plant has been registered. For more information, see *Configuring SmartPlant Instrumentation for Integration* in the *Administration User's Guide*, under *SmartPlant Integration and Item Registry*.
- From the SmartPlant Foundation Web Client, you can perform a number of tasks, such as publishing or retrieving documents, comparing documents, subscribing to document changes, and so forth. Many of these tasks can be performed from the authoring tools, such as SmartPlant P&ID or SmartPlant Electrical, but the Web Client provides unique access to other features such as the Web Client To Do List and search capabilities.

Updating SmartPlant Information in Title Blocks

Update Title Block is a SmartPlant Foundation add-in that allows you to update published SmartPlant Instrumentation reports to the latest revisions and to include issue data in the custom title blocks. Also, the add-in converts the published reports with their title blocks from SmartPlant Instrumentation native format (.brw, .ssf, and .spd files) to .pdf files.

Prior to running the Update Title Block add-in, you need to configure your custom title blocks so that they meet the requirements for integration reports. For more information, see *Title Block Requirements for Integration Reports* (on page 421).

After you have configured your custom title blocks, you need to install the Update Title Block Component. This component contains the .dll file that enables the inclusion of issue data in your custom title blocks in native SmartPlant Instrumentation format and the conversion of reports to .pdf files. For more information, see *Install the Update Title Block Component for SmartPlant Instrumentation* (on page 423).

NOTES

- For the .brw, .ssf, and .spd file types, SmartPlant Foundation uses the component address (ProgID): SPITitleBlock.TitleBlockInfo
- These file types are already configured in the delivered database dump files.

Title Block Requirements for Integration Reports

The title blocks in the reports used for integration contain macros that specify issue data. You can generate these reports either in SmartPlant Instrumentation native format (.brw, .ssf, or .spd) or enhanced report (.sma) format. For both of these formats, there are shipped files that you can use that include the correct formatting and data for the reports. There are also certain requirements that you need to follow if you intend to customize your own reports.

PowerSoft Reports

The title block files for the reports in .psr format are in the location <SmartPlant Instrumentation installation folder>\PSR\ and the available files are as follows:

- A3tall_inchunit.psr
- A3tall_pbunit.psr
- A3wideborder_inchunit.psr
- A3wideborder_pbunit.psr
- A4tall_inch.psr
- A4tall_pbunit.psr
- A4tall_pbunit_general.psr
- A4widerborder_inchunit.psr
- A4widerborder_pbunit.psr

If you are creating your own custom reports in .psr format in which you want to include issue data, you must create a custom title block and add macros as shown in the following table.

Section Heading	Macro Name
ISSUE	issueno_x
REV	issuedrevision_x
MATERIAL OR JOB SPEC	materialorjobspec_x
BID (DATE ISSUED FOR)	bid_x
FAB (DATE ISSUED FOR)	fabrication_x
CONST (DATE ISSUED FOR)	construction_x
REF (DATE ISSUED FOR)	reference_x
SITE	sitename
SITE LOCATION	sitelocation

Section Heading	Macro Name
DIVISION	divisionname
DIVISION LOCATION	divisionlocation

For the macro names, 'x' represents an integer used to specify the sequence, for example, issueno_1, issueno_2, and so forth.

Enhanced Reports

The title blocks that use the .sma format are designed to be used by all the tools that communicate in an integrated environment; however, if you use them in SmartPlant Instrumentation as delivered, parts of the drawing may overlap the margins of the drawing area. For this reason, you need to set values of the working area margins for any templates that you intend to use for generating reports in an integrated environment. To prepare the templates, you define the settings under **Preferences > Enhanced Reports** (for all layouts of a particular report type) or for a specific layout as desired.

The template files are installed on the SmartPlant Instrumentation machine. The default location for enhanced report templates for the reports used in an integrated environment is:

<SmartPlant Instrumentation installation folder>\RAD\Template\Generic*.sma

The title block files are installed on the SmartPlant Instrumentation machine. The default location for enhanced report title blocks for the reports used in an integrated environment is:

<SmartPlant Instrumentation installation folder>\RAD\Template\Generic\TitleBlocks*.sym

The following settings represent the minimum values required for the working area margins:

Title Block	Left	Right	Top	Bottom
D Wide	0.44	0.3	0.3	0
C Wide	0.7	0.3	0.3	0
B Wide	0.3	0.3	0.3	0
A1 Wide	0.7	0.3	0.5	0
B Tall	0	0	0.3	0
A3 Tall	0	0	0.3	0
A Wide	0	0	0.3	0
A2 Wide	0.7	0.2	0.5	0
A3 Wide	0	0	0.3	0
A4 Wide	0	0	0.4	0

NOTE To place issue data on other title blocks for enhanced reports, use the SmartPlant Instrumentation **Place Drawing Property Label** command in the Enhanced Report Utility. For more information, see *Enhanced Report Utility User's Guide > Working with Templates and Title Blocks > Place Property Labels on a Drawing Sheet*.

Associating a Custom Title Block with SmartPlant Instrumentation

After you have finished creating a report title block and customized it in InfoMaker to fit your needs, you need to associate it with SmartPlant Instrumentation so that the Domain Administrator can assign it to the appropriate reports. If needed, you can edit the associated title block properties by defining the headers for revision custom fields and defining the headers for the drawing records.

NOTE There are title blocks that come shipped with SmartPlant Instrumentation. For the list of available title blocks and their descriptions, see *Title Block Descriptions* in the *Administration User's Guide*, under *Domain and Project Administration*, *Report Management*.

Open a Custom Title Block

1. In the main SmartPlant Instrumentation window, click **Tools > Title Blocks**.
2. On the **Title Blocks** dialog box, click **New** to open the **Title Block Properties** dialog box.
3. Do one of the following:
 - Navigate to the .psr file that you have created containing the new custom title block, and select this file.
 - Navigate to the **Default TB with IN Units.psr** file, or the **Default TB with PB Units.psr** file.
4. Click **Open**.
5. On the **Title Block Properties** dialog box, do the following if required:
 - a. Under **Revision custom field headers**, in the **Header** column, type the name for each custom field.
 - b. In the **Title block name** field, type the name that you have selected for the title block.
 - c. Under **Document custom field headers**, in the **Header** column, type the name for each custom field.

NOTE If you want to modify the number of revisions of custom title blocks, you need to add more revision rows and create appropriate macros in InfoMaker. The **Revision rows** box displays the number of revision rows that you have customized for your title block.

6. Click **OK** to save the edited title block and add it to the inventory of title blocks in SmartPlant Instrumentation.
7. On the **Title Blocks** dialog box, click **Close** to return to the main window.

Install the Update Title Block Component for SmartPlant Instrumentation

The SmartPlant Instrumentation title block component is only required if you are using SmartPlant Instrumentation in an integrated environment. The SmartPlant Instrumentation title block component software must be installed on the same computer as the SmartPlant Foundation Title Block component. These components are usually installed on the SmartPlant Foundation server, but may be installed on another server.

1. Insert the SmartPlant Foundation installation media into the DVD drive. If the installation does not start automatically, double-click **setup.exe** on the CD.
2. Click **SmartPlant Software** in the **SmartPlant Foundation Installation** window.
3. Click **SmartPlant Instrumentation Title Block Installation**.

NOTE If you have installed the SmartPlant Instrumentation Title Block component previously, the software prompts you to modify, repair, or remove the older version of the component. After you uninstall the older version, click **SmartPlant Instrumentation Title Block Installation** again in the **SmartPlant Foundation Installation** window.

- Click **Next**.
- To accept the default installation location for the SmartPlant Instrumentation Title Block component, click **Next**.

TIP If you want to change the installation location, click **Browse** and navigate to the new folder. Then, click **Next**.

- Click **Finish**.

NOTES

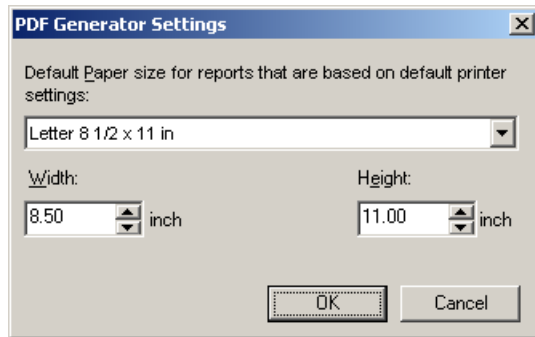
- If you are working on a 64-bit computer, to enable PDF generation, create a new local printer port with a custom name and then assign the PDF printer (SmartPlant PDF Converter) to the port. For details, see *Create a New Local Printer Port (64-bit server only)* (on page 424).
- The driver used for printing the PDF files, SmartPlant PDF Converter 401, is included in the SmartPlant installation.

Configure PDF Generator Settings

- Open a command prompt window.
- Execute the following command to run Updatectb and set PDF printer configuration settings:
updatectb.exe /s

NOTE If necessary, change to or include the full path to Updatectb.exe to ensure you are executing the correct version. By default, it is installed at C:\Program Files\SmartPlant\Instrumentation\Title Block Component.

- On the **PDF Generator Settings** window, select the correct paper size for PDF output.



- Click **OK**.

Create a New Local Printer Port (64-bit server only)

NOTE If your SmartPlant Foundation server is installed on a 64-bit edition of Windows, perform the following procedure. This procedure is not necessary on 32-bit editions of Windows.

- Click **Start > Printers and Faxes**.
- Open the properties window for **SmartPlant PDF Converter**.

NOTE The printer named **SmartPlant PDF Converter** is created automatically when SmartPlant Instrumentation Title Block Component is installed.

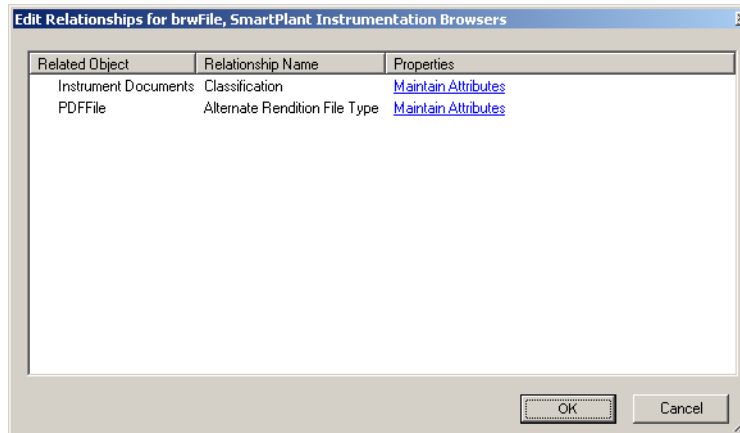
- Click the **Ports** tab.
- Click **Add Port**.

5. On the **Printer Ports** dialog box, select the **Local Port**, and then click **New Port** from the list.
6. Type a port name in the **Enter a port name** box and click **OK**.
NOTE You can enter any descriptive name, such as **AmyuniPDF**.
7. On the **Printer Ports** dialog box, click **Close**.
8. On the **Ports** window, check the new port in the list, if it is not already checked, and click **Apply**.
9. Click **OK** to close the printer properties window.

Specify the Full Path to Updatectb.exe

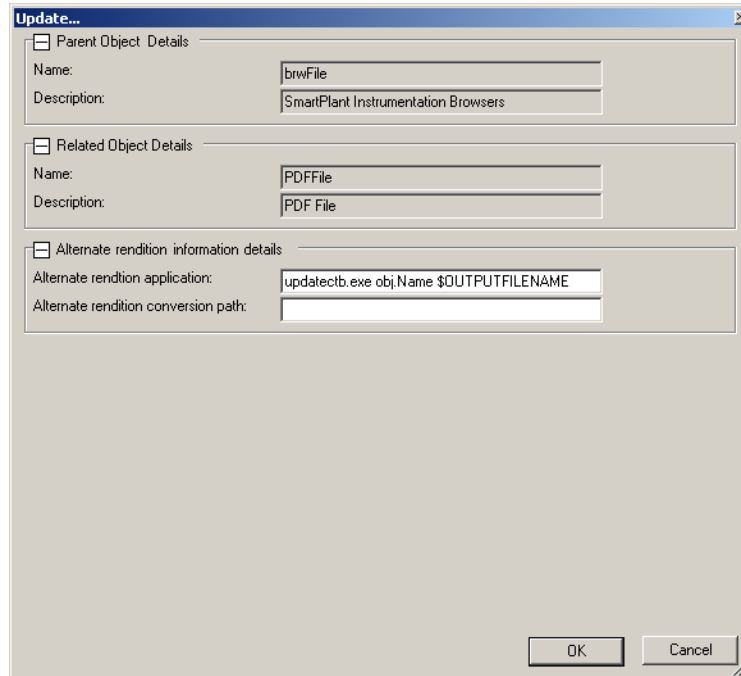
NOTE To ensure that the PDF generation for the SmartPlant Instrumentation file types (.brw, .ssf, .spd) uses the correct version of the Title Block Component, it may be necessary to specify the full path to Updatectb.exe on the application server.

1. Log into SmartPlant Foundation Desktop Client as a user with Engineer and System Administration roles.
2. Click **Find > Administration > File Type**.
3. On the **Find File Type** dialog box, type * into the **Enter Name** box and click **OK**.
4. Select the file type for which you want to enter a full path specification.
5. Click the right mouse button and select **Edit Relationship** from the menu.
6. Click **Maintain Attributes** for the **PDF File** object.



7. On the **Update** dialog box, edit the command-line string in the **Alternate rendition application** box so the value includes the full path. For example: **"C:\Program Files\SmartPlant\Instrumentation\Title Block Component\updatectb.exe" obj.Name -dir \$OUTPUTFILENAME**

NOTE For these file types, the string will already be filled in as **updatectb.exe obj.Name \$OUTPUTFILENAME**



8. Click **OK**.
9. Click **OK** to close the Edit Relationships dialog box.

Schema Mapping

This section describes the assumptions, rules, and limitations imposed by the SmartPlant Instrumentation adapter on schema mapping.

This section describes the structure of the tool schema and how it is used by the authoring tool SmartPlant integration adapter in support of the publish and retrieve operations. This topic does not provide a list of the classes, properties, or enumerated lists (select lists) that are mapped by the delivered SmartPlant Instrumentation tool schema. You can obtain this information by viewing the tool schema directly. This set of topics does not describe the user interface of the Schema Editor.

Before modifying the mapping for SmartPlant Instrumentation, you must understand:

- The SmartPlant Instrumentation software
- The SmartPlant Instrumentation data model
- The delivered mapping for SmartPlant Instrumentation
- How the delivered mapping for SmartPlant Instrumentation works
- SmartPlant schema modeling
- The Schema Editor
- The To Do List feature of SmartPlant Instrumentation

In the topics that describe schema mapping, the following terms are frequently referenced:

- Tool schema — Defines the SmartPlant Instrumentation objects to be published or retrieved and how they map to objects in the SmartPlant schema. The tool map schema implements mapping between the objects in the SmartPlant Instrumentation data model and the objects in the SmartPlant schema. Users who customize either the SmartPlant Instrumentation data model or the SmartPlant schema may also need to customize the mapping contained in the tool schema.

- SmartPlant schema — Defines the SmartPlant integration data model.
- Adapter — The SmartPlant Instrumentation code module that supports the SmartPlant integration commands.

When you publish SmartPlant Instrumentation data, the SmartPlant integration adapter extracts data from the SmartPlant Instrumentation database and converts it into a set of objects and relationships that are compatible with the SmartPlant schema. These objects and relationships are defined in an .xml file, which is sent to SmartPlant Foundation for further processing. For SmartPlant Instrumentation, the name of this file is INtoolsMap.xml, and it must be located in the folder specified in the **Path for SmartPlant XML files** box of the **Domain Definition** window.

See Also

Workflow for Extending the Schema (on page 441)

Define a Schema for SmartPlant Instrumentation (on page 465)

Export a New Schema Configuration (on page 467)

General Information About Schema Mapping

This topic provides general information about the mapping in SmartPlant Instrumentation.

SmartPlant Instrumentation Adapter

Each authoring tool has an adapter that processes information during the publish and retrieve operations. One of the adapter's functions is to map information between SmartPlant Integration and the particular authoring tool. The SmartPlant Instrumentation adapter is a component that belongs to SmartPlant Instrumentation and requires installation of SmartPlant Instrumentation Version 2009 on one of the following database platforms:

- Oracle 10g
- SQL Server 2005

Any communication between SmartPlant Foundation and SmartPlant Instrumentation is performed via this adapter, which sends information to SmartPlant Integration through the Common UI where the user is shown the appropriate user interface and data available.

The adapter does not handle tool schema files directly, but uses them indirectly. The tool schema files are used to define the retrieve map file, which is then used by the adapter. Direct use of the schema files would mean that the adapter accessed them directly to do its work. Both retrieve and publish operations only work through map files.

Mapping Configuration

The SmartPlant Instrumentation adapter uses the tool schema map file and the Schema Editor, delivered with the SmartPlant Schema Component, to perform mapping between the SmartPlant Instrumentation object structure and the structure of objects in SmartPlant integration. The map file is installed with SmartPlant Instrumentation Setup. This file includes all objects that are mapped for SmartPlant integration (not the entire set of objects in SmartPlant Instrumentation, nor all properties, but only those that are relevant for other applications that use SmartPlant Integration).

Tool Schema Location

The name of the SmartPlant Instrumentation tool schema files are: INtoolsMap.xml, ContextMap.xml, and NamingConventionMap.xml. SmartPlant Instrumentation uses these files for all types of published and retrieved documents. They are installed by default in the path <SmartPlant Instrumentation home folder>\XML\ and should be treated as installation files. If you move or copy these .xml files to a different folder, the System Administrator can specify the location in the Administration module, **Domain Definition** window, by typing it in the **Path for SmartPlant XML files** box. This allows you to specify a different tool schema for each domain.

SmartPlant Instrumentation Mapping Examples

The sections that follow provide mapping examples for SmartPlant Instrumentation. For more information and mapping examples, see the *SmartPlant Mapping User's Guide*.

SmartPlant Instrumentation Example: Mapping New Enumerated List Entries Starting in the Tool

The following topic provides an example of adding and defining mapping for a new enumerated list entry for the Instrument Status list starting in the SmartPlant Instrumentation.

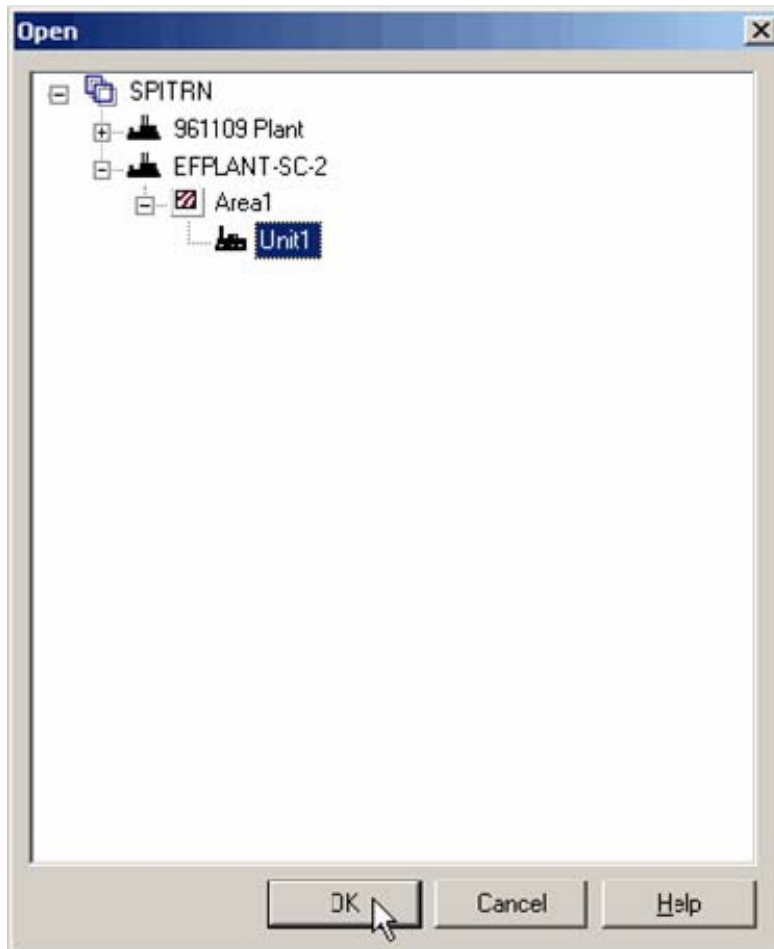
Before You Begin

1. Make a backup of the SmartPlant Foundation site database and any vaults for the site.
2. Make a backup of the SmartPlant Instrumentation database and the INtoolsMap.xml file located in the SmartPlant resources directory.

Create the List Entry in the Instrument Status Table

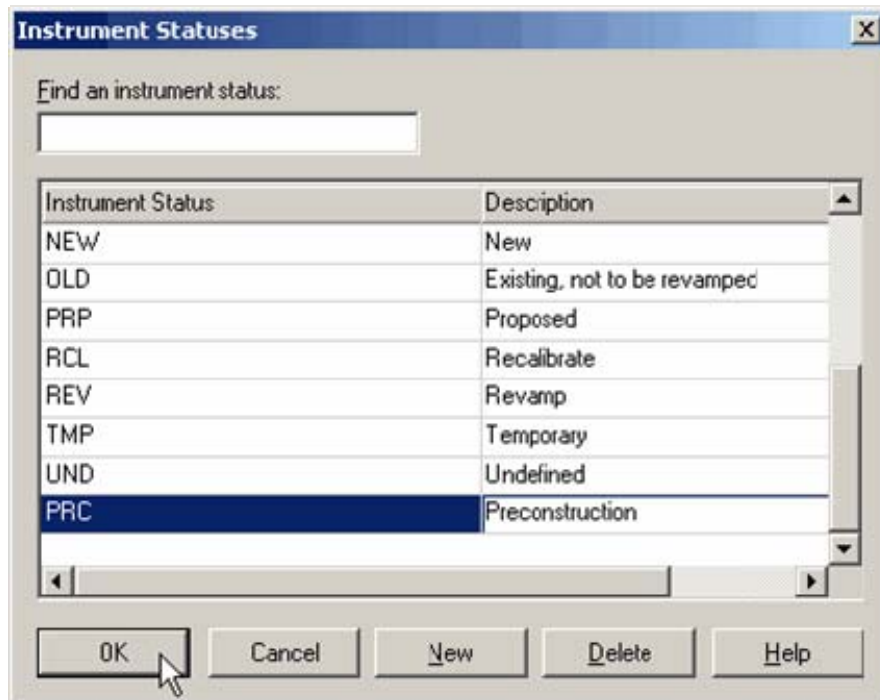
1. Click **Start > All Programs > Intergraph SmartPlant Instrumentation > SmartPlant Instrumentation**.
2. Log on to SmartPlant Instrumentation

3. In the **Open** window, click the appropriate plant, then click **Unit**.



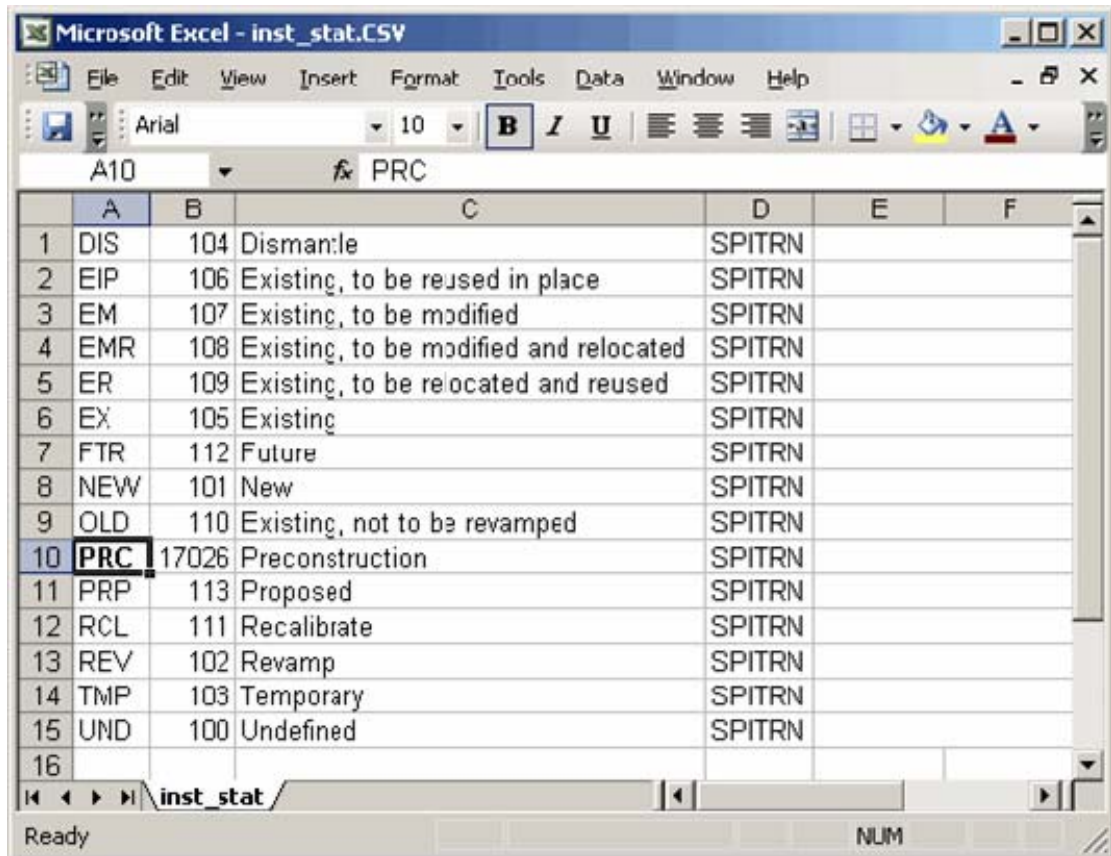
4. Close **Domain Explorer**.
5. Click **Modules > Instrument Index**
6. In the **Instrument Index** dialog box, click **Tables > Instrument Statuses**.
7. In the **Instrument Statuses** dialog box, click **New** to define the new enumerated list item.

8. In the **Instrument Statuses** dialog box, type **PRC** as the prefix and **Preconstruction** as the description.



9. To verify the new Instrument Status has been added, click **Reports > Tables > Instrument Statuses**. The report appears.
10. Click **Save As** to save a copy of the report.
11. In the **Save As** dialog box, click **Original**, then click **OK**.
12. Save the file with a .CSV extension.
13. Open the report in Microsoft Excel.

14. Find **PRC** in column A and **Preconstruction** in column C. A number appears in column B.



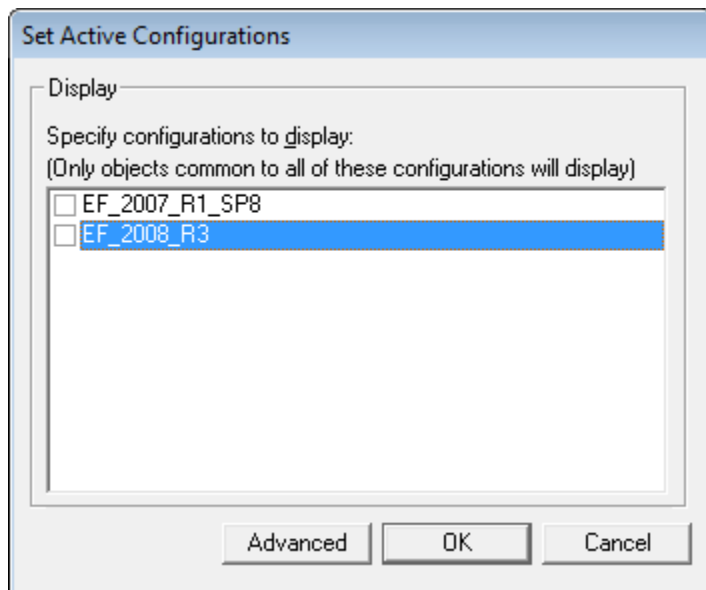
	A	B	C	D	E	F
1	DIS	104	Dismantle	SPITRN		
2	EIP	106	Existing, to be reused in place	SPITRN		
3	EM	107	Existing, to be modified	SPITRN		
4	EMR	108	Existing, to be modified and relocated	SPITRN		
5	ER	109	Existing, to be relocated and reused	SPITRN		
6	EX	105	Existing	SPITRN		
7	FTR	112	Future	SPITRN		
8	NEW	101	New	SPITRN		
9	OLD	110	Existing, not to be revamped	SPITRN		
10	PRC	17026	Preconstruction	SPITRN		
11	PRP	113	Proposed	SPITRN		
12	RCL	111	Recalibrate	SPITRN		
13	REV	102	Revamp	SPITRN		
14	TMP	103	Temporary	SPITRN		
15	UND	100	Undefined	SPITRN		
16						

15. Close Microsoft Excel and SmartPlant Instrumentation.

Load the SmartPlant Instrumentation Tool Map Schema

1. In the Desktop Client, check out the SmartPlant schema CMF file and launch the Schema Editor.

2. In the **Set Active Configurations** dialog box, select the schema version or versions that you want your changes to apply to, and click **OK**.



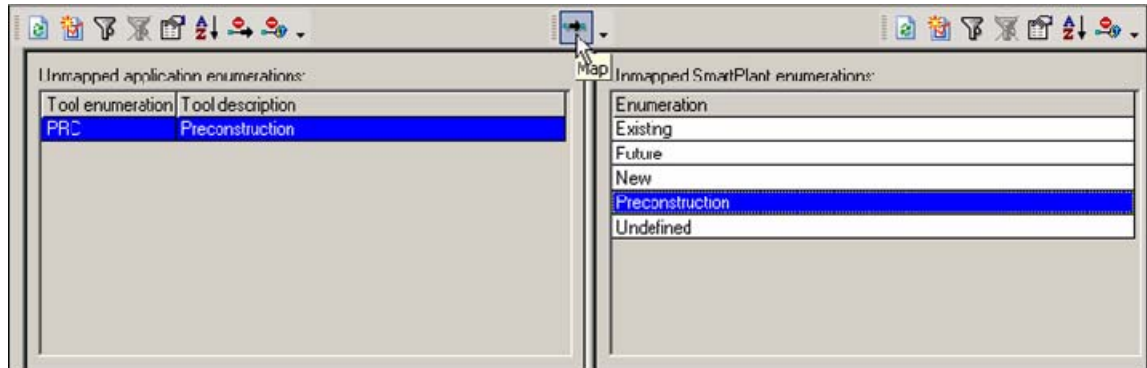
3. In the Schema Editor, click **File > SmartPlant > Edit Engineering Tool Options** and select INtools in the list of authoring tools to load the INtools tool map schema.
4. Under **Startup options**, select the **Load map schema**.
NOTE **Connect to Application Schema** is checked by default.
5. Click **Finish**.
6. In the **Synchronize** dialog box, select the appropriate action in the <Tool> Database or <Tool Map Schema Path> row to update inconsistencies between the tool metadata and tool map schema, and click **OK**. Default actions appear in blue in the appropriate column and row for each difference.

Synchronize					
For each row below select option that should be applied					
Class	Parent Name	Name	Property	SPI Database	
SPMapEnumDef	InstrumentLocations	Control Panel		Exists - Delete it	Missing - Ad
SPMapEnumDef	InstrumentLocations	On valve		Exists - Delete it	Missing - Ad
SPMapEnumDef	LoopTypes	Close		Exists - Delete it	Missing - Ad
SPMapEnumDef	ConstructionStatuses	PRC		Exists - Delete it	Missing - Ad
SPMapEnumDef	InstrumentLocations	Field	Description	Set value to "Field"	Set value to
SPMapEnumDef	LoopTypes	DCS	Description	Set value to ""	Set value to
SPMapEnumDef	LoopTypes	Electrical	Description	Set value to ""	Set value to
SPMapEnumDef	LoopTypes	Local	Description	Set value to ""	Set value to
SPMapEnumDef	LoopTypes	Open	Description	Set value to ""	Set value to
SPMapEnumDef	LoopTypes	PLC	Description	Set value to ""	Set value to
SPMapEnumDef	LoopTypes	Pneumatic	Description	Set value to ""	Set value to
SPMapEnumDef	ConstructionStatuses	EIP	Description	Set value to "Existing, to be reused in place "	Set value to
SPMapEnumDef	InstrumentLocations	Remote	Description	Set value to "Remote"	Set value to

TIP Default actions appear in blue in the appropriate column and row for each difference.

Add the New Status Entry to the SmartPlant Schema

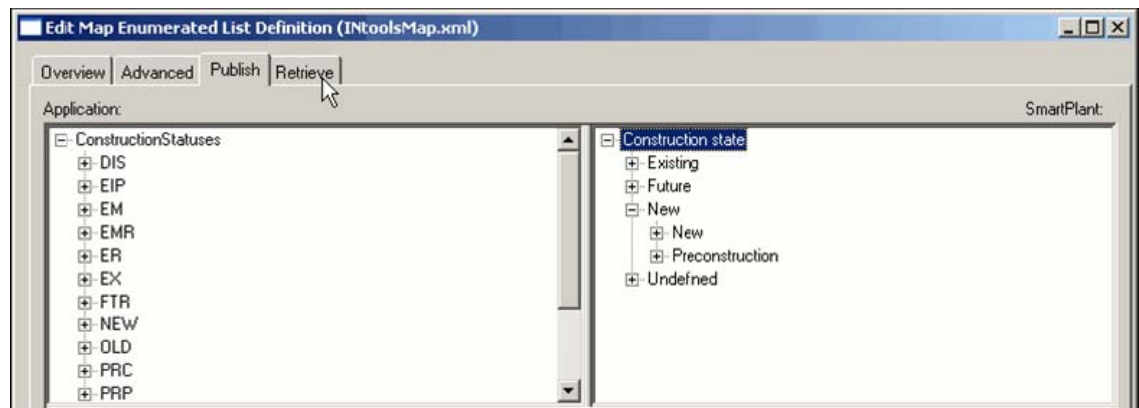
1. In the **Map Environment**, expand **SmartPlant Instrumentation > Loaded Map Schemas > INtools Tool Schema**.
2. Expand the **Map Enumerated Lists** node, and right-click **Construction Statuses**.
NOTE **Construction Statuses** is called **Instrument Status** in SmartPlant Instrumentation.
3. Click **Edit Construction Statuses**.
4. Click the **Publish** tab.
5. In the SmartPlant schema tree view on the left side of the **Publish** tab, click **PRC**, then on the right side, click **Preconstruction**.



6. Click **Map** .
7. Click **OK**.

Define the Mapping to Retrieve Construction Statuses

1. Click the **Retrieve** tab.



2. In the SmartPlant schema tree view on the left side of the **Retrieve** tab, click **PRC**, then on the right side, click **Preconstruction**.
3. Click **Map** .
4. Click **OK**.

Save the Tool Map Schema and Schema Extensions File

- Click **File > Save > All Modified Files** to save the SmartPlant schema extensions and the tool map schema. For some tools, saving the tool map schema also saves changes to the tool metadata database.

NOTES

- When you close the Schema Editor, the software prompts you to save your connection information, user interface options, and loaded tool map schemas to a session file. Click **Yes** in the message box to save the session file.
- If you extend the SmartPlant schema, you must load the changes into the SmartPlant Foundation database. For more information, see the *SmartPlant Schema Editor User's Guide*.

SmartPlant Instrumentation Example: Mapping a New String Property Starting in the Tool

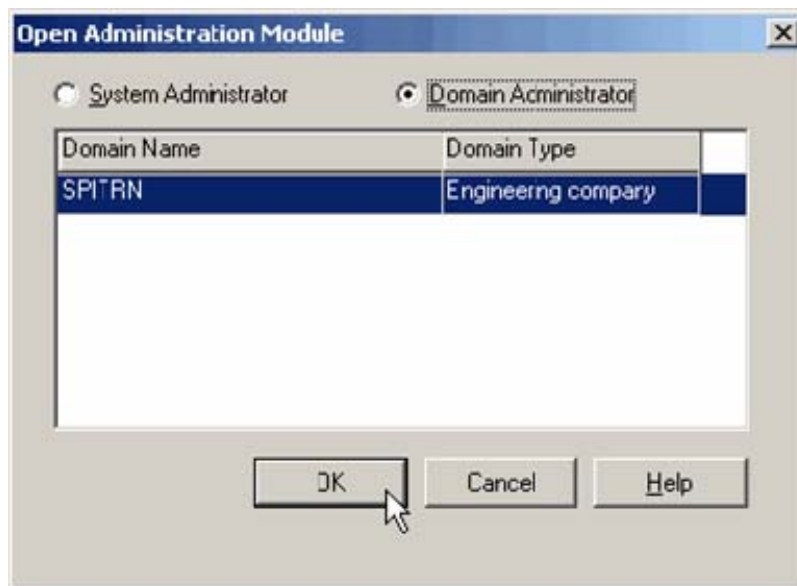
The following topic provides an example of adding and defining mapping for a simple string property called SystemCode for SmartPlant Instrumentation.

Before You Begin

1. Make a backup of the SmartPlant Foundation site database and any vaults for the site.
2. Make a backup of the SmartPlant Instrumentation database and the INtoolsMap.xml file located in the SmartPlant resources directory.

Create the New SystemCode Property in SmartPlant Instrumentation Administration

1. Click **Start > All Programs > Intergraph SmartPlant Instrumentation > Administration**.
2. Log on to SmartPlant Instrumentation Administration.
3. Click **Domain Administrator**, and then select the domain name from the list.



4. Click **Fields**.
5. In the **Custom Fields** dialog box, select the appropriate plant and item type.

6. In the first blank row, type the information for the SystemCode property, and click **Apply**.

Plant: EFPLANT-SC-2

Item type: Instrument

Number	Definition	Field Type	Length
1	SystemCode	Char	8
2		Char	20
3		Char	20
4		Char	20
5		Char	20
6		Char	20
7		Char	20
8		Char	20
9		Char	20

Buttons: Apply, Close, Copy From..., Print, Help

7. Click **OK** when the confirmation dialog box appears.

8. In the **Item Type** list, select **loop**, and type the information for another **SystemCode** property.

Custom Fields

Plant: EFPLANT-SC-2

Item type: Loop

Number	Definition	Field Type	Length
1	SystemCode	Char	8
2		Char	40
3		Char	40
4		Char	40
5		Char	40
6		Char	40
7		Char	40
8		Char	40
9		Char	40

Buttons: Apply, Close, Copy From..., Print, Help

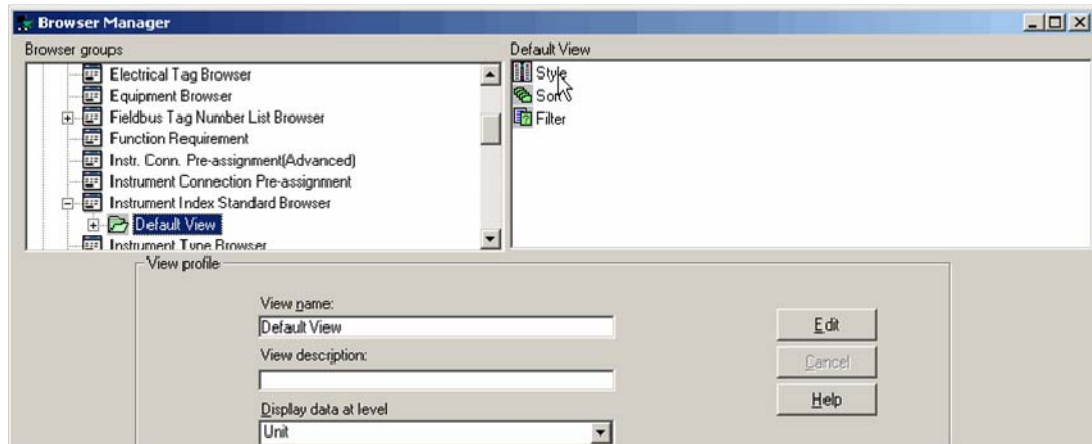
9. Click **Apply**, then click **Close**.
10. Click **File > Exit**.

Add the New SystemCode Property in SmartPlant Instrumentation

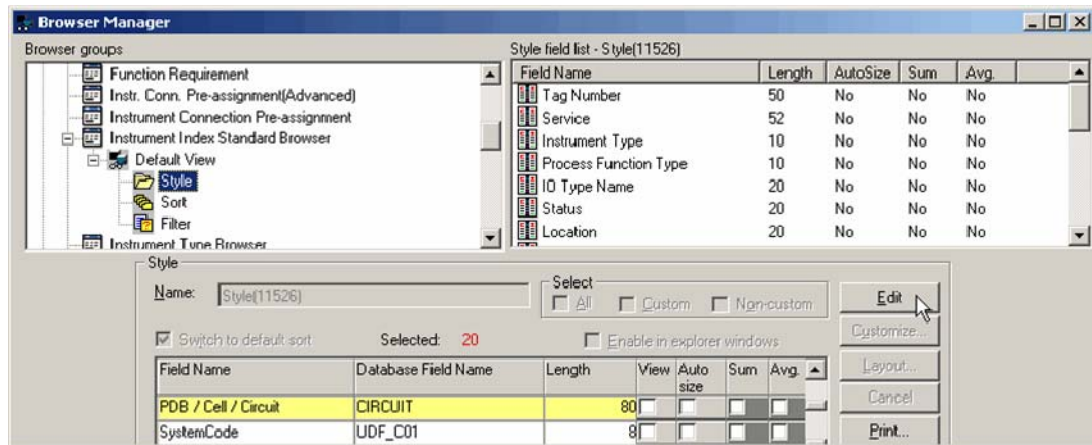
1. Click **Start > All Programs > Intergraph SmartPlant Instrumentation**.
2. Log on to SmartPlant Instrumentation.

TIP If the **Windows Authentication Login** is enabled in SmartPlant Instrumentation Administration, you will not be prompted to log on. For more information about enabling **Windows Authentication Login**, see the *SmartPlant Instrumentation User's Guide*.
3. Click **Modules > Instrument Index**.
4. At the bottom of the **Instrument Index Module** dialog box, click **Browser**.
5. In the **Browser** dialog box, click **Manager**.
6. Under **Browser Groups**, click **Instrument Index Standard Browser > Default View**

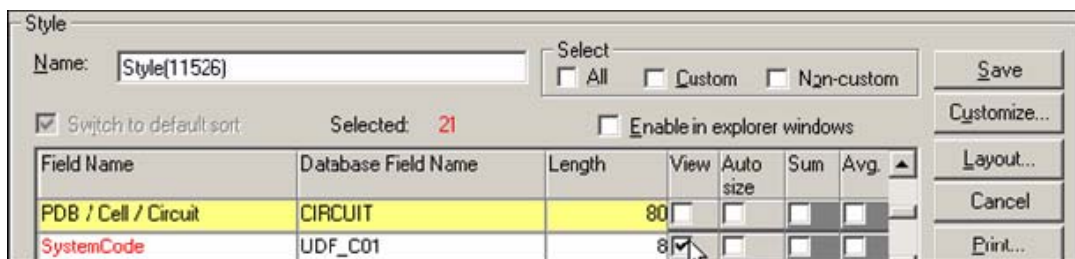
7. Under **Default View** on the right, double-click **Style**.



8. Under **Browser Groups**, expand **Instrument Index Standard Browser > Default View**, then select **Style**.
9. In the **Style** list at the bottom of the dialog box, select **SystemCode**, then click **Edit**.



10. For **SystemCode**, select the **View** check box.

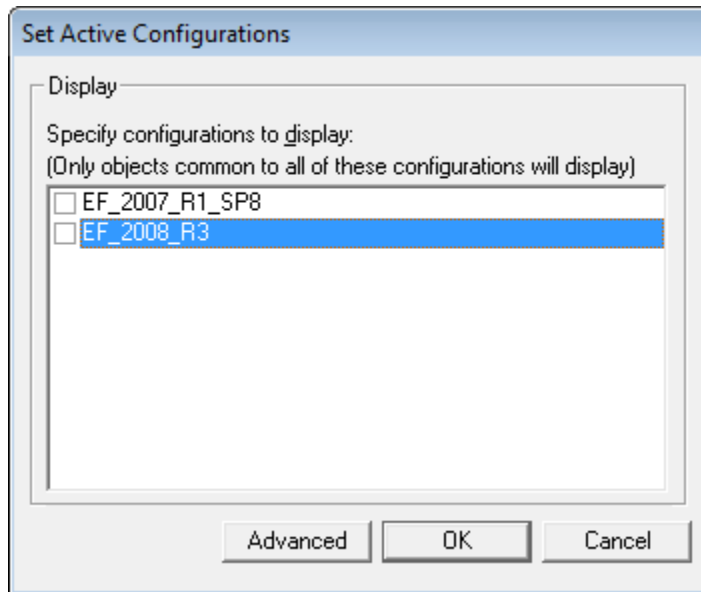


11. Click **Save**.
12. Click **Open View**. Scroll to the left, **SystemCode** appears in the dialog box.
13. Click **File > Exit** to exit SmartPlant Instrumentation.

Launch Schema Editor and Load the SmartPlant Instrumentation Tool Map Schema

1. In the Desktop Client, check out the SmartPlant schema CMF file and launch the Schema Editor.

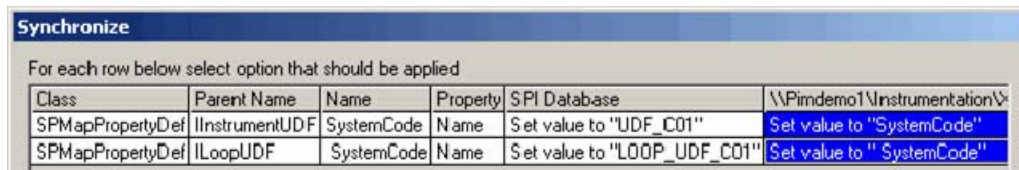
2. In the **Set Active Configurations** dialog box, select the schema version or versions that you want your changes to apply to, and click **OK**.



3. In the Schema Editor, click **File > SmartPlant > Edit Engineering Tool Options** and select INtools in the list of authoring tools to load the INtools tool map schema.
4. Under **Startup options**, select the **Load map schema**.

TIPS

- **Connect to Application Schema** is checked by default.
- The new enumerated list entry that you added in the authoring tool appears in the **Synchronization** dialog box to be added to the tool map schema file.

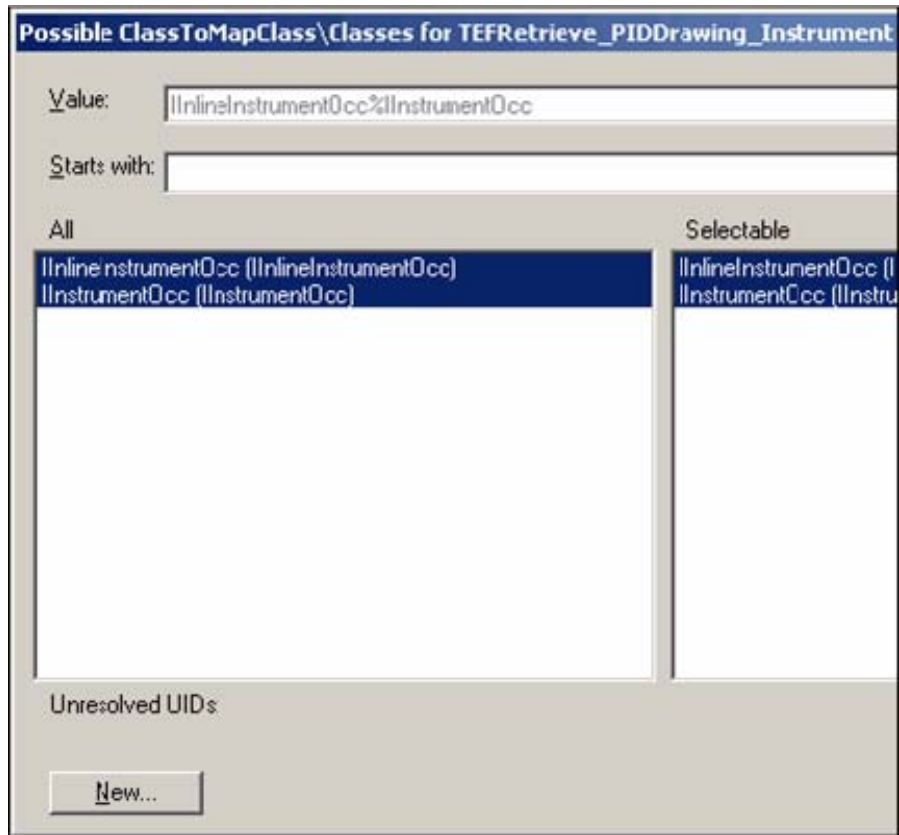


5. Click **OK** in the **Synchronize** dialog box to update the tool map schema.

Map the New Custom Property

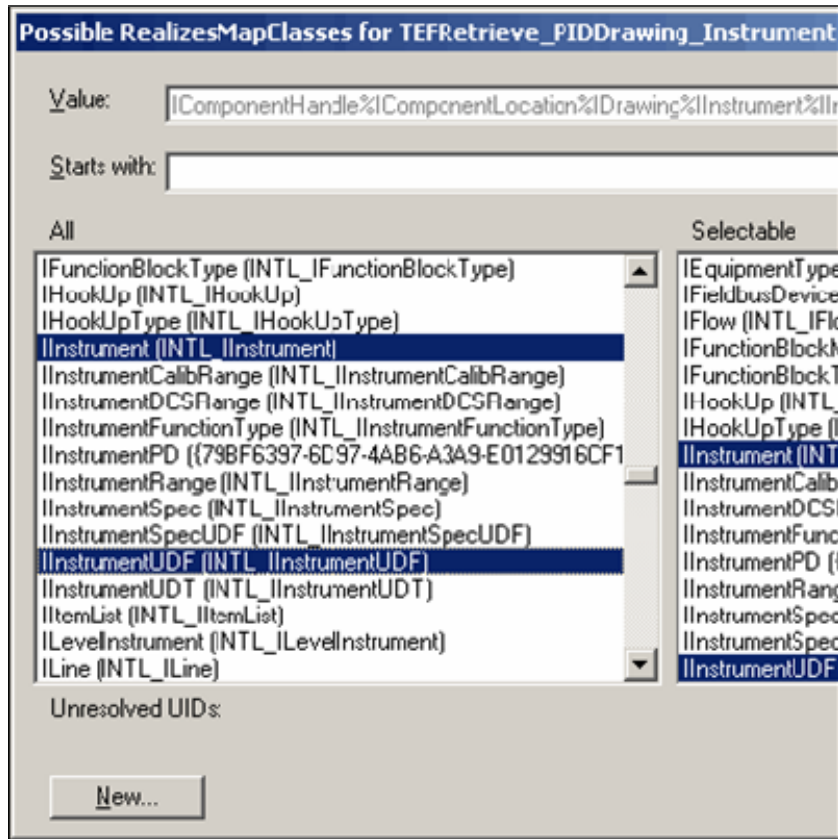
1. In the **Map Environment**, expand **SmartPlant Instrumentation > Loaded Map Schemas > INtools Tool Schema**.
2. Expand the **Map Classes** and **TEFPublish** nodes.
3. Right-click **TEFRetrieve_PID Drawing_Instrument**, and click **Edit TEFRetrieve_PID Drawing_Instrument** on the shortcut menu.
4. In the **Edit Map Class definition** dialog box, click **Retrieve from SmartPlantclass/interface**.

5. Select **InlineInstrumentOcc** and **InstrumentOcc** from the list, and click **OK**.



6. Click the **Advanced** tab.
7. Click **Realizes**.

8. Select **IIInstrumentUDF** from the list. Click **OK**.



9. Click the **Retrieve** tab.
 10. Under **Unmapped application properties**, select **SystemCode**.
 11. Under **Unmapped SmartPlant properties**, select **SystemCode**.
 12. Click **Map** .
 13. Click **OK**.

Save the Tool Map Schema and Schema Extensions File

- Click **File > Save > All Modified Files** to save the SmartPlant schema extensions and the tool map schema. For some tools, saving the tool map schema also saves changes to the tool metadata database.

NOTES

- When you close the Schema Editor, the software prompts you to save your connection information, user interface options, and loaded tool map schemas to a session file. Click **Yes** in the message box to save the session file.
- If you extend the SmartPlant schema, you must load the changes into the SmartPlant Foundation database. For more information, see the *SmartPlant Schema Editor User's Guide*.

Upgrading the SmartPlant Instrumentation Tool Schema for a New Software Version

If you have previously customized the SmartPlant Instrumentation tool schema for a previous version, you will need to upgrade the latest INtoolsMap.xml file in order to preserve your custom changes.

CAUTION Before removing the previous version of SmartPlant Instrumentation, be sure to back up your existing INtoolsMap.xml file so that you do not lose your custom changes. The INtoolsMap.xml file is located in the path <SmartPlant Instrumentation home folder>\XML\.

Upgrade the SmartPlant Instrumentation Tool Schema

With this procedure, the software upgrades the INtoolsMap.xml file, including user customizations, with the latest version data from the files in the '<SmartPlant Instrumentation home folder>\XML\Backup' folder path and registers the schema version at the beginning of the INtoolsMap.xml file.

1. In the SmartPlant Instrumentation Administration module, log on as Domain Administrator in the domain where you are going to work in an integrated environment.
2. Click **File > Domain Definition**.
3. On the **Domain Definition** window, select the desired domain.
4. On the **Module Toolbar**, click **Edit** .
5. Beside **Path for SmartPlant XML files**, click **Browse** to navigate to the location of the INtoolsMap.xml file containing your custom definitions.
6. Click **SmartPlant > Upgrade Schema**.

See Also

Define a Schema for SmartPlant Instrumentation (on page 465)

Export a New Schema Configuration (on page 467)

Workflow for Extending the Schema

When you need to extend the SmartPlant schema, such as when new properties or select list entries are added, you or an administrator must take steps to update the data in SmartPlant Instrumentation. The overall steps include:

1. Generate component schemas using the Schema Editor.
2. Run the SmartPlant Instrumentation Schema Configuration Wizard to extend the configuration of the SmartPlant Instrumentation data model, which provides a view of your data.

The wizard output is a schema hierarchy with the following structure:

```

Schema name
  Document type
    Object type (class)
    Interface
    Properties
  
```

The following example illustrates how the hierarchy is organized for two object types, 'Loop' and 'Instrument', both belonging to the document type 'InstrumentIndex':

```

TEFPublish(publish)
  InstrumentIndex
    Loop
  
```

```
ILoop
    LOOP_NAME
    LOOP_SERV
Instrument
    IInstrument
        CMPNT_NAME
        CMPNT_SERV
```

For details of the procedure, see *Define a Schema for SmartPlant Instrumentation* (on page 465).

3. Run the Export Schema Configuration Utility to create a new tool schema map file using the classes that you selected with the SmartPlant Instrumentation Schema Configuration Wizard. For details of the procedure, see *Export a New Schema Configuration* (on page 467).

TIPS

- The tool schema class is identified by a unique name consisting of <schema name>_<document name>_<class>.
 - For SmartPlant Instrumentation, the source file is INtoolsMap.xml.
4. Using the Schema Editor, open the newly-created tool map class and synchronize it with the SmartPlant Instrumentation tool schema. For more information, see *Synchronizing Schemas* (on page 449).

IMPORTANT To be able to publish data that includes the new classes, you need to rename the target .xml file to 'INtoolsMap.xml'.

Modify the Tool Schema for a Custom Plant Hierarchy

1. Create a hierarchy in SmartPlant Instrumentation that contains the same number of levels as the one defined in the SmartPlant Foundation custom hierarchy. For details, see *Create a Plant Hierarchy* in the *Administration User's Guide*, under *Domain Administration, Plant Design and Structure*.
2. Modify the following information in the delivered INtoolsMap.xml file to map it to the levels in the example custom hierarchy.

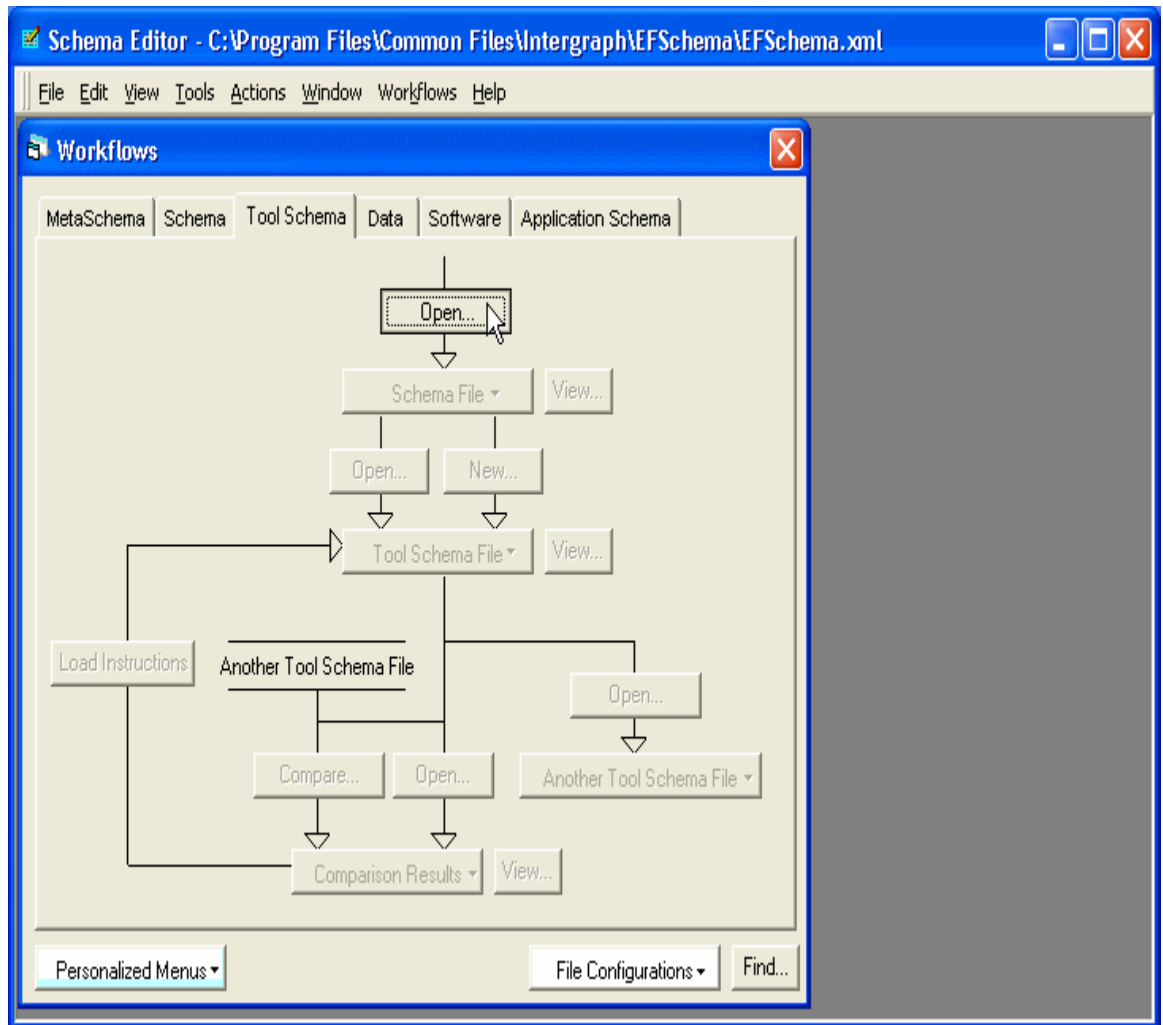
NOTES

- The INtoolsMap.xml file is installed by default in the path <SmartPlant Instrumentation home folder>\XML\.

INtoolsMap.xml File Level	Mapped To	Custom Hierarchy Level
TEFRetrieve_PBSDocument_Plant	County	Top level
TEFRetrieve_PBSDocument_Area	City & District	Intermediate levels
TEFRetrieve_PBSDocument_Unit	Precinct	Lowest level

- The values in the **Mapped To** column are for this example only. You should substitute the appropriate values for your hierarchy.
 - You will need to create new map classes ICity, IDistrict, and IPrecinct. For details of the procedure, see *Creating New Objects and Relationships in the Schema* in the *Schema Editor User's Guide*.
3. Launch Schema Editor.
 4. On the **Workflows** dialog box, click the **Tool Schema** tab.

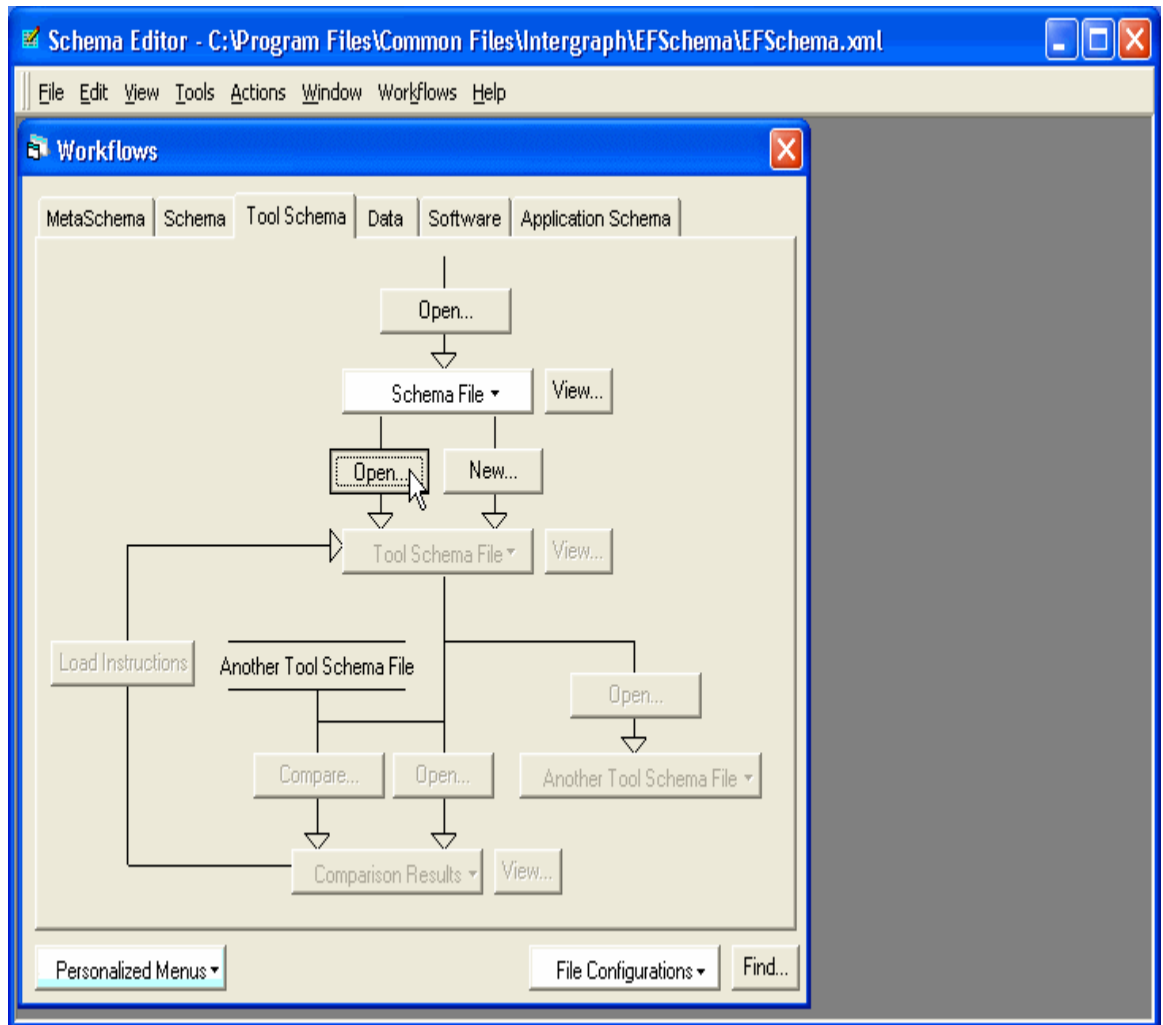
5. Click **Open**.



6. Navigate to the file path: Program Files > Common Files > Intergraph > EFSchema > EFSchema.xml.

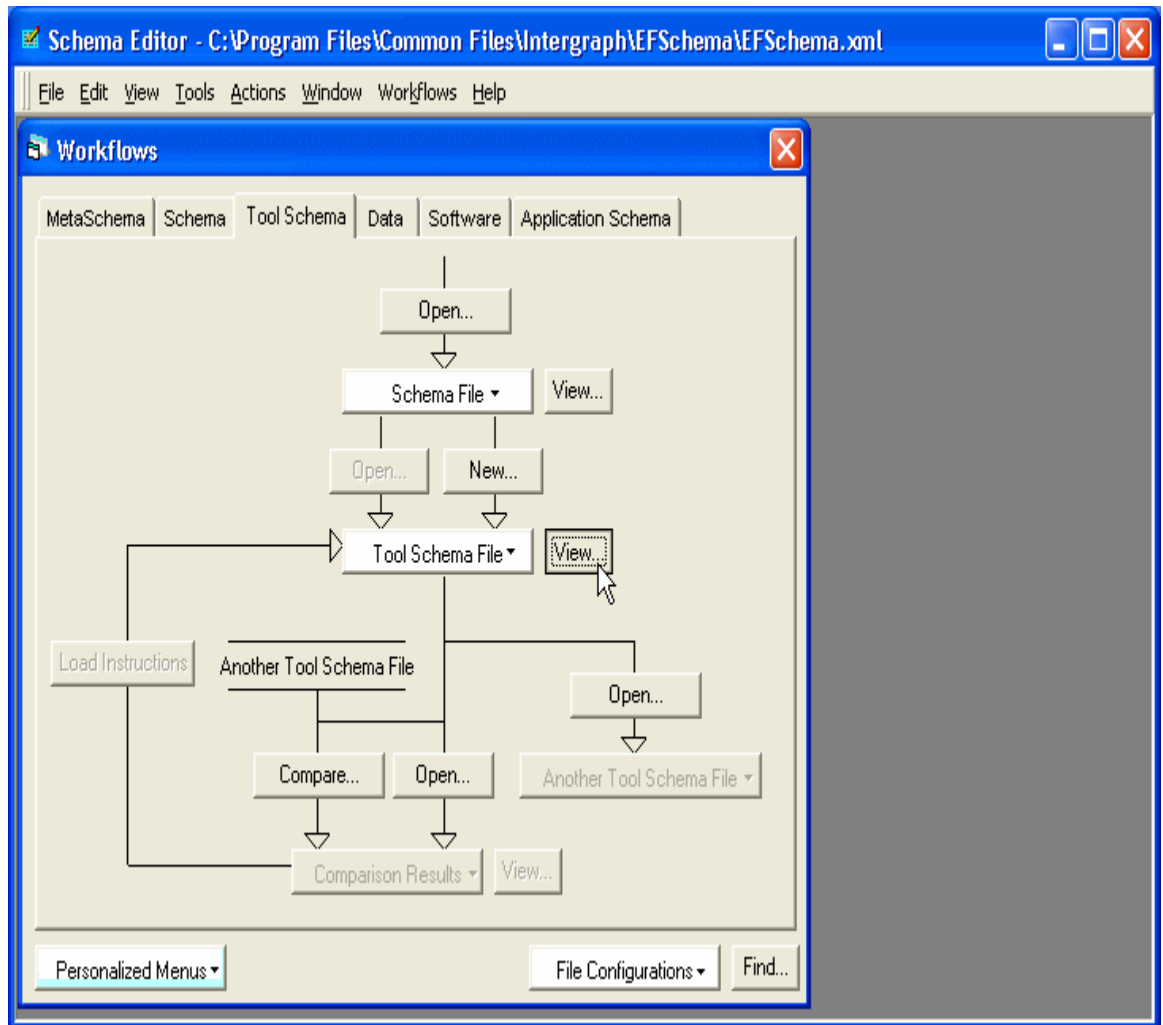
NOTE The file may take some time to open.

- Click **Open** to select the tool schema file.



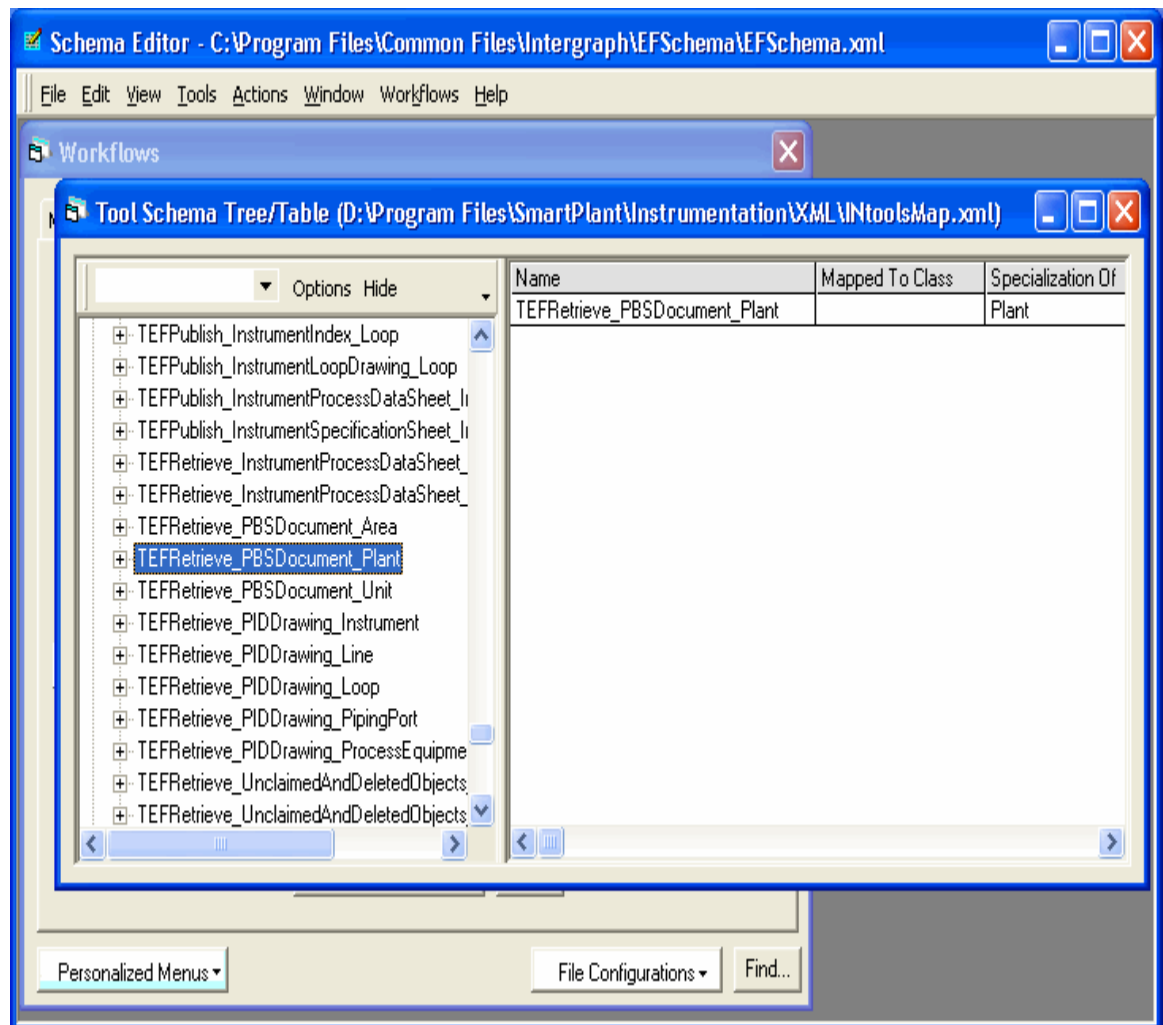
- Navigate to the INtoolsMap.xml file.

9. Click **View**.



10. On the **View Tool Schema** dialog box, from the **Form** list, select **Tree/Table Horizontal**, and then click **OK**.
11. In the tree view, expand the **SPMapClassDef** node.

12. Scroll down to the **TEFRetrieve_PBSDocument_Plant** node.



13. Right-click this SPMAPClass and on the shortcut menu, click **Edit INTL_TEFRetrieve_PBSDocument_Plant**.

14. On the **Edit Map Class Definition** dialog box, under the **Retrieve map** section, clear the value **IPlant** and click the ellipsis button as shown:

The screenshot shows the 'Edit Map Class Definition' dialog box with the following fields and values:

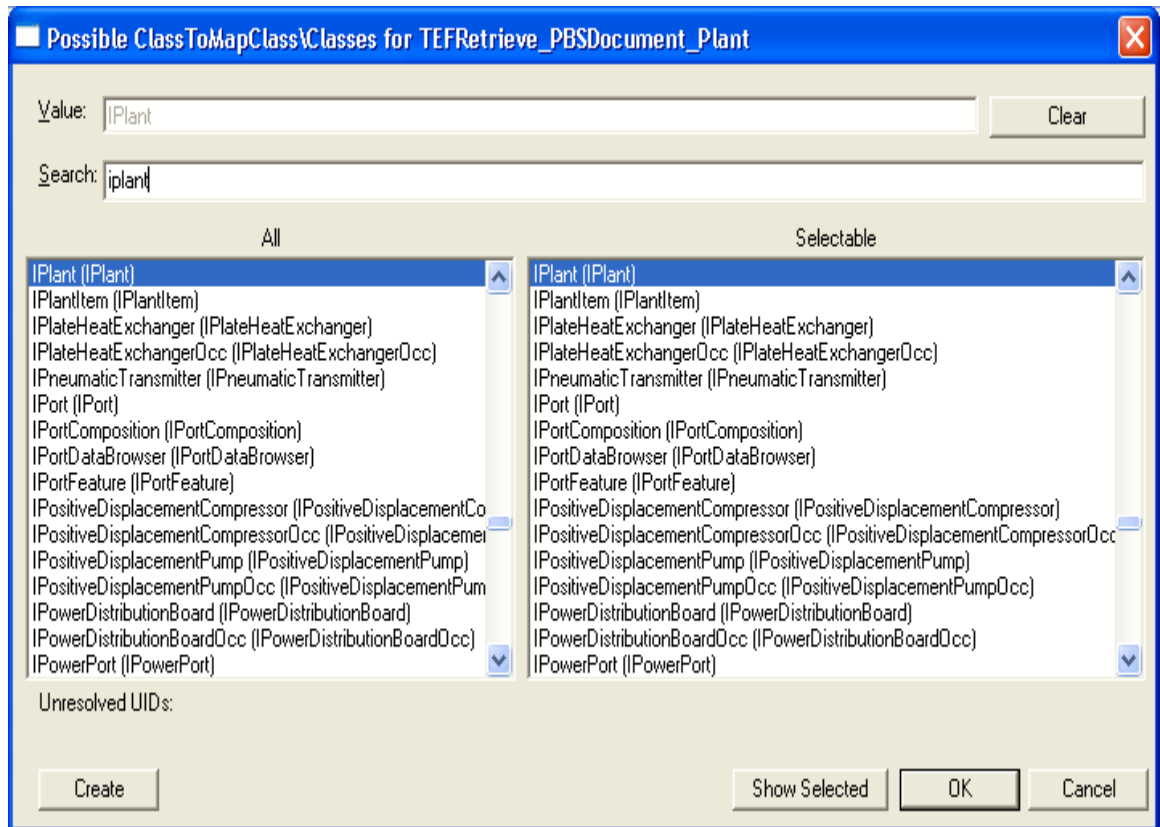
- Map class definition:**
 - *UID: INTL_TEFRetrieve_PBSDocument_Plant
 - Tool_QID: INTL_3_12_29
 - *Name: TEFRetrieve_PBSDocument_Plant
 - Is interface?: False
 - Description:
 - Select criteria:
 - Process criteria:
 - Map note:
- Map properties:**
 - Specialization of: Plant
 - Generalization of:
 - Realizes: IPlant
 - Is realized by:
 - * Mapping option: Include Realized
 - Mapping status:
- Publish map:**
 - Publish to EF class/interface:
 - Map Properties
- Retrieve map:**
 - Retrieve from EF class/interface: IPlant (circled in red)
 - Map Properties (ellipses button circled in red)

* = Required

Buttons at the bottom: Change UID, OK, Cancel

15. On the dialog box **Possible ClassToMapClass\Classes for TEF Retrieve_PBSDocument_Plant**, in the **Search** box, type **iplant**.

16. Select **IPlant** as shown and click **OK**.



NOTE The top level interface (IPlant in this example) cannot be renamed. Therefore in the custom hierarchy, the top level will always be mapped to IPlant. Consequently, the IPlant interface remains mapped to the IPlant interface (as shown in the graphic) and no mapping changes are required.

17. Click **OK** to close the **Edit Map Class Definition** dialog box.
18. Right-click the **TEFRetrieve_PBSDocument_Area** node, and on the shortcut menu, click the **Edit** option.
19. On the **Edit Map Class Definition** dialog box, under the **Retrieve map** section, clear the value **IFunctionalArea** and click the ellipsis button.
20. On the dialog box **Possible ClassToMapClass\Classes for TEF Retrieve_PBSDocument_Area**, map the intermediate level interface to **ICity** and **IDistrict**.
21. Click **OK** to close the **Edit Map Class Definition** dialog box.
22. Right-click the **TEFRetrieve_PBSDocument_Unit** node, and on the shortcut menu, click the **Edit** option.
23. On the **Edit Map Class Definition** dialog box, under the **Retrieve map** section, clear the value **IFunctionalUnit** and click the ellipsis button.
24. On the dialog box **Possible ClassToMapClass\Classes for TEF Retrieve_PBSDocument_Unit**, map the lowest level interface to **IPrecinct**.
25. Click **OK** to close the **Edit Map Class Definition** dialog box.
26. Click **File > Save**.
27. Close the Schema Editor, and at the prompts to save the data and to load the changes to the SmartPlant Foundation Server, click **Yes**.

Synchronizing Schemas

This section describes how to use the Schema Editor to synchronize the tool metadata (stored in the tool's database) and the map schema file (INtoolsMap.xml) when you define new properties for publishing or retrieving.

You can begin the update by first adding a new property to the tool metadata and then synchronizing the map schema file to it, or you can first modify the map schema file and then synchronize the metadata with it.

There is a special procedure for synchronizing newly-defined enumerated lists (select lists). For details, see *Synchronize an Enumerated List* (on page 457).

NOTE For SmartPlant Instrumentation, new properties are created using custom fields.

IMPORTANT You are not allowed to delete a property that you have already synchronized between the tool metadata and the map schema file because the software cannot determine whether data values exist for that property.

See Also

Workflow for Extending the Schema (on page 441)

Define a Schema for SmartPlant Instrumentation (on page 465)

Export a New Schema Configuration (on page 467)

Synchronize the Map Schema File with the Tool Schema

1. In the SmartPlant Instrumentation Administration module, log on as Domain Administrator in the domain defined for an integrated environment.
2. Click **Activities > Custom Fields**.
3. Select the plant that you have registered for integration.
4. Select the item type appropriate for the property you want to add.

5. Add the desired property name in the **Definition** column of a vacant custom field (with field type **Char**).

Custom Fields

Plant: Plant1

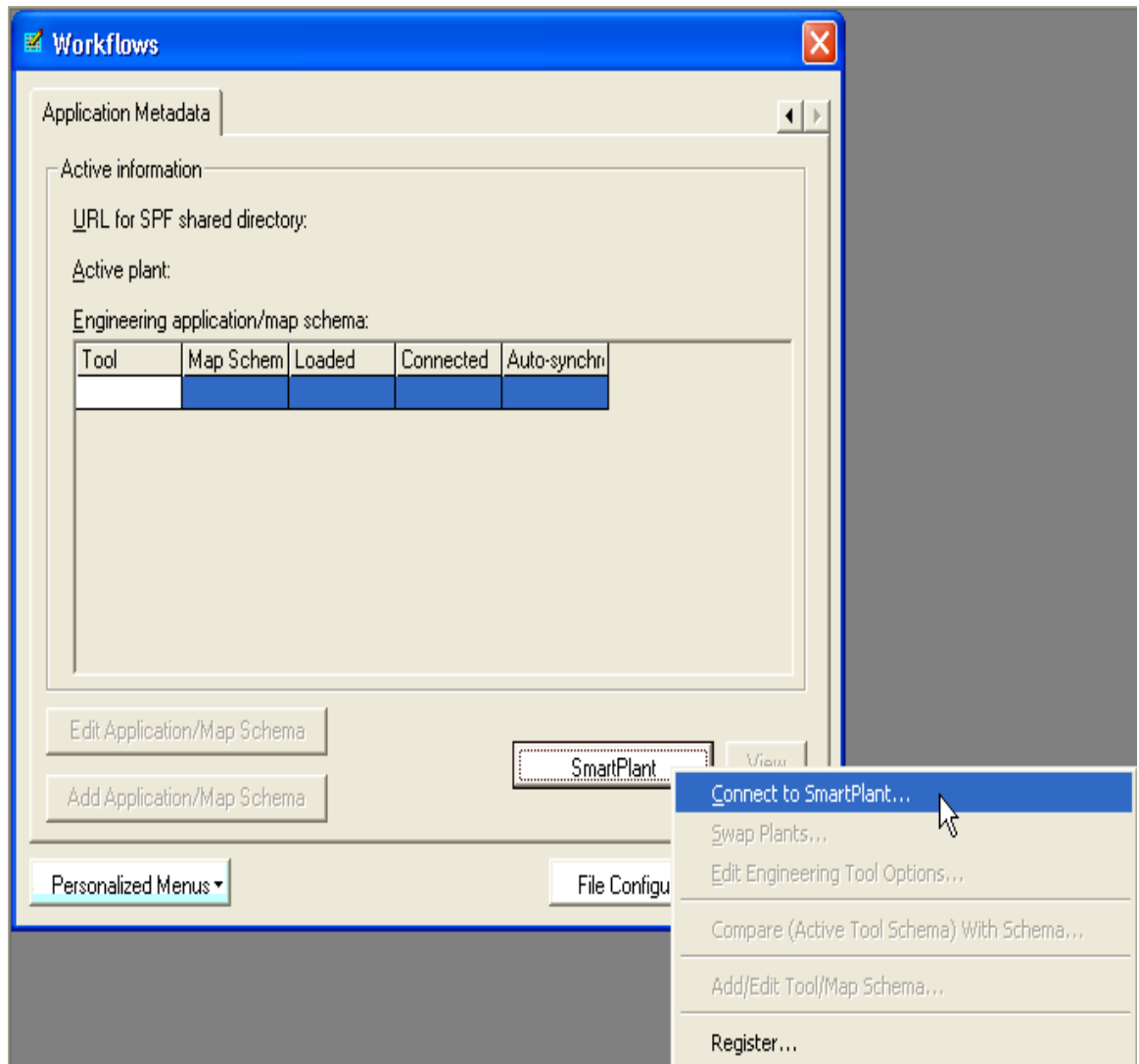
Item type: Instrument

Number	Definition	Field Type	Length
1	My Custom Value 1	Char	20
2	My Custom Value 2	Char	20
3		Char	20
4		Char	20
5		Char	20
6		Char	20
7		Char	20
8		Char	20

Buttons: Apply Close Copy From... Print Help

6. Click **Apply** and then click **Close**.
7. Click **Start > Intergraph SmartPlant Foundation > SmartPlant Schema Component > SmartPlant Schema Editor**.
8. In the **Workflows** window, click the **Application Metadata** tab.

9. Connect to the SmartPlant Foundation database as shown.



10. On the **SmartPlant Foundation URL** page of the **SmartPlant Registration Wizard**, type the node name and virtual directory of the SmartPlant Foundation database where you registered your plant. Use the following format: `http://<SPFServer>/<VirtualDirectory>`.

For example:

`http://<SPFServer>/SPFASP`

NOTES

- Replace <SPFServer> with the name of your SmartPlant Foundation Web server.
- Replace <VirtualDirectory> with the name of the virtual directory for the SmartPlant Foundation Web Client. By default, the virtual directory for the first instance of the Web Client that you install is SPFASP. However, if you install multiple instances of the Web Client to connect to multiple databases, the virtual directory name may be different.

11. Click **Next**.
12. On the **SmartPlant Foundation Plant** page, select from the **Plant name** list the SmartPlant Foundation plant in which you want to synchronize your data.
13. Click **Next**.

14. On the **Engineering Application Options** page, select from the **Engineering application/map schema** list the schema for the tool that you want to synchronize.
15. Under **Startup options**, select the **Load map schema** check box.
TIP For SmartPlant Instrumentation, the software automatically selects the **Connect to application schema** check box.
16. If desired, select the **Automatically synchronize schemas** check box.
NOTE You can select more than one schema from the **Engineering application/map schema** list (if available) and specify the startup options. In this case, the software will load the map schema for each application and perform connection and synchronization as specified.
17. Click **Finish** to complete the connection.

The **Synchronize** window opens with all the properties selected by default for synchronizing in the map schema file (located in this example in the path C:\Program Files\SmartPlant\Instrumentation\XML\INtoolsMap.xml).

Synchronize

For each row below select option that should be applied

Class	Parent Name	Name	Property	SPI Database	C:\Program Files\SmartPlant\Instrumentation\XML\INtoolsMap.xml
SPMapEnumDef	InstrumentLocations	Field	Description	Set value to "Field"	Set value to "
SPMapEnumDef	ConstructionStatuses	EIP	Description	Set value to "Existing, to be reused in place "	Set value to "Existing, to be
SPMapPropertyDef	InstrumentUDF	My Custom Value 1	Name	Set value to "UDF_C01"	Set value to "My Custom Va
SPMapPropertyDef	InstrumentUDF	My Custom Value 2	Name	Set value to "UDF_C02"	Set value to "My Custom Va
SPMapEnumDef	InstrumentLocations	Remote	Description	Set value to "Remote"	Set value to ""

OK

18. Do one of the following:
 - Leave the properties selected where you want the software to synchronize the map schema file by updating it with the value from the application database.

- Select the properties in the **SPI Database** column where you want the software to update the database with the current value from the map schema file.

Synchronize

For each row below select option that should be applied

Class	Parent Name	Name	Property	SPI Database	C:\Program Files\SmartPlant
SPMapEnumDef	InstrumentLocations	Field	Description	Set value to "Field"	Set value to "
SPMapEnumDef	ConstructionStatuses	EIP	Description	Set value to "Existing, to be reused in place"	Set value to "Existing, to be
SPMapPropertyDef	InstrumentUDF	My Custom Value 1	Name	Set value to "UDF_C01"	Set value to "My Custom Va
SPMapPropertyDef	InstrumentUDF	My Custom Value 2	Name	Set value to "UDF_C02"	Set value to "My Custom Va
SPMapEnumDef	InstrumentLocations	Remote	Description	Set value to "Remote"	Set value to ""

OK

19. Click **OK** to synchronize the data and open the **Map Environment** window.

Map Environment

Select other classes Options Hide

Tool

- SmartPlant Electrical
- SmartPlant Instrumentation
 - Loaded Map Schemas
 - INtools Tool Schema
 - Map Classes
 - Map Enumerated Lists
 - Map Relationship Definitions
 - Map UoM Lists
- SmartPlant P&ID

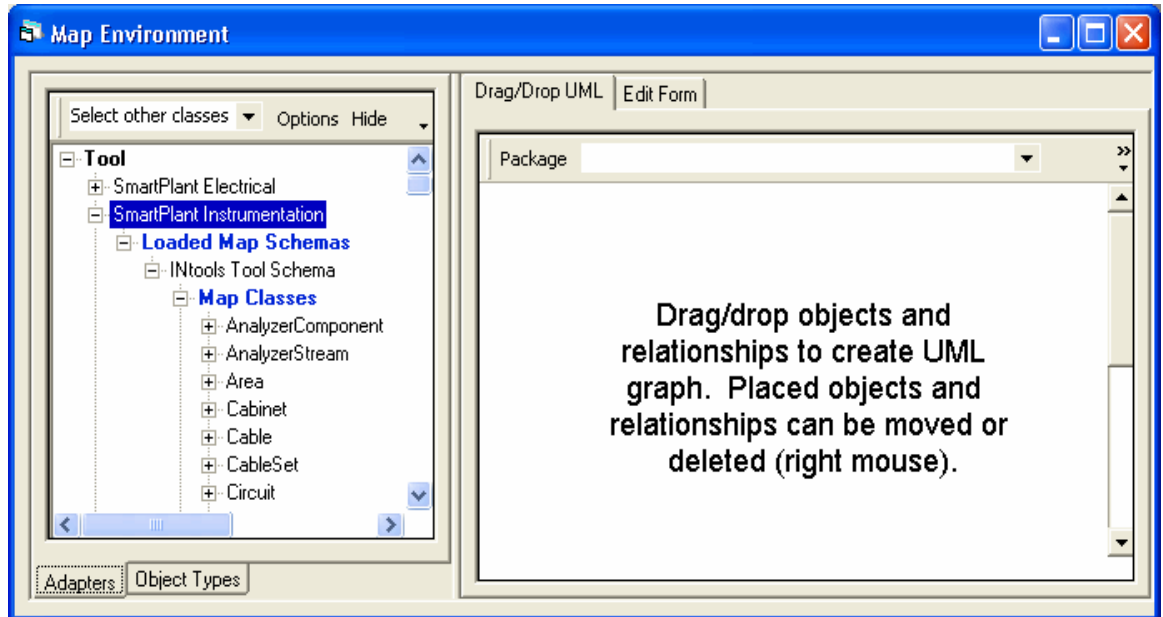
Adapters Object Types

Drag/Drop UML Edit Form

Package

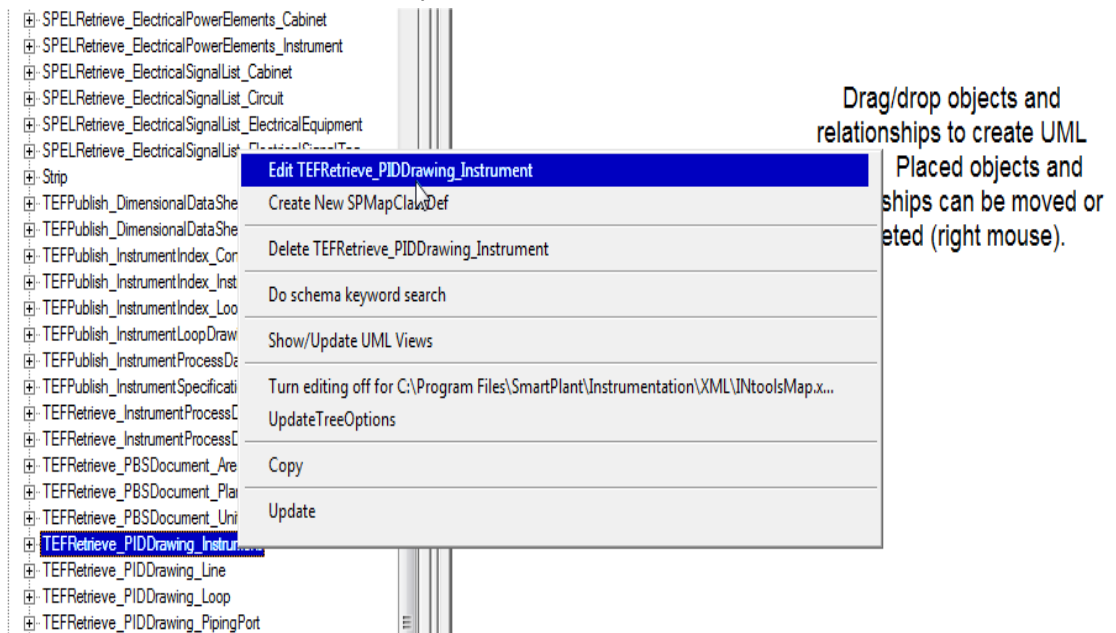
Drag/drop objects and relationships to create UML graph. Placed objects and relationships can be moved or deleted (right mouse).

20. Expand the **SmartPlant Instrumentation** node by clicking the  icons.

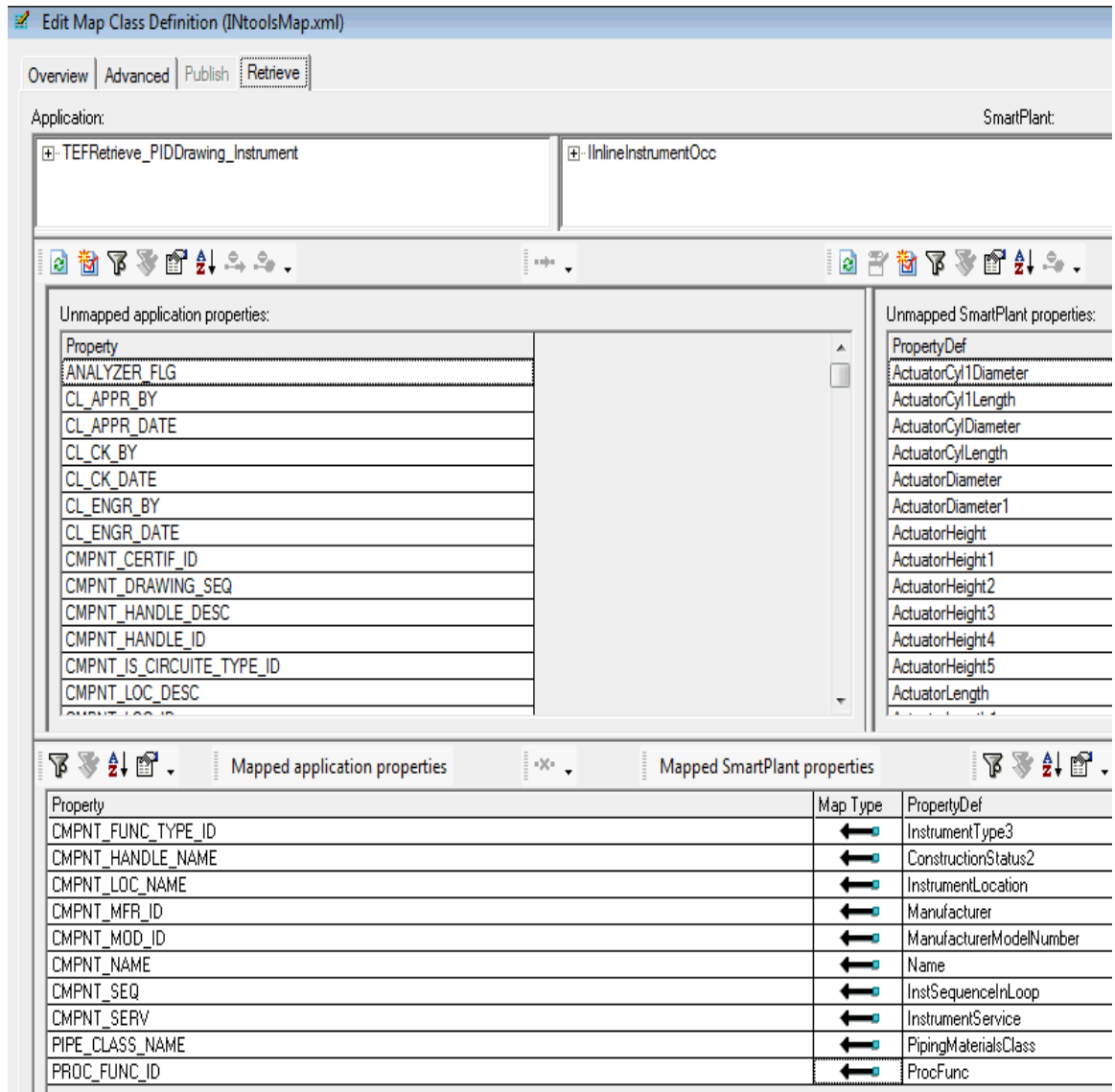


NOTE The remainder of this procedure describes an example where you are going to map the custom fields that you defined to a map class for retrieving instruments from a SmartPlant P&ID drawing. The actual map class that you select depends on how you want to map the fields that you defined, and on whether you choose to publish or retrieve the data.

21. Under the **Map Classes** node, scroll down to **TEFRetrieve_PIDDrawing_Instrument** (the map class that defines instrument retrieval from SmartPlant P&ID drawings) and right-click the map class.
22. On the shortcut menu, click the **Edit** option as shown.



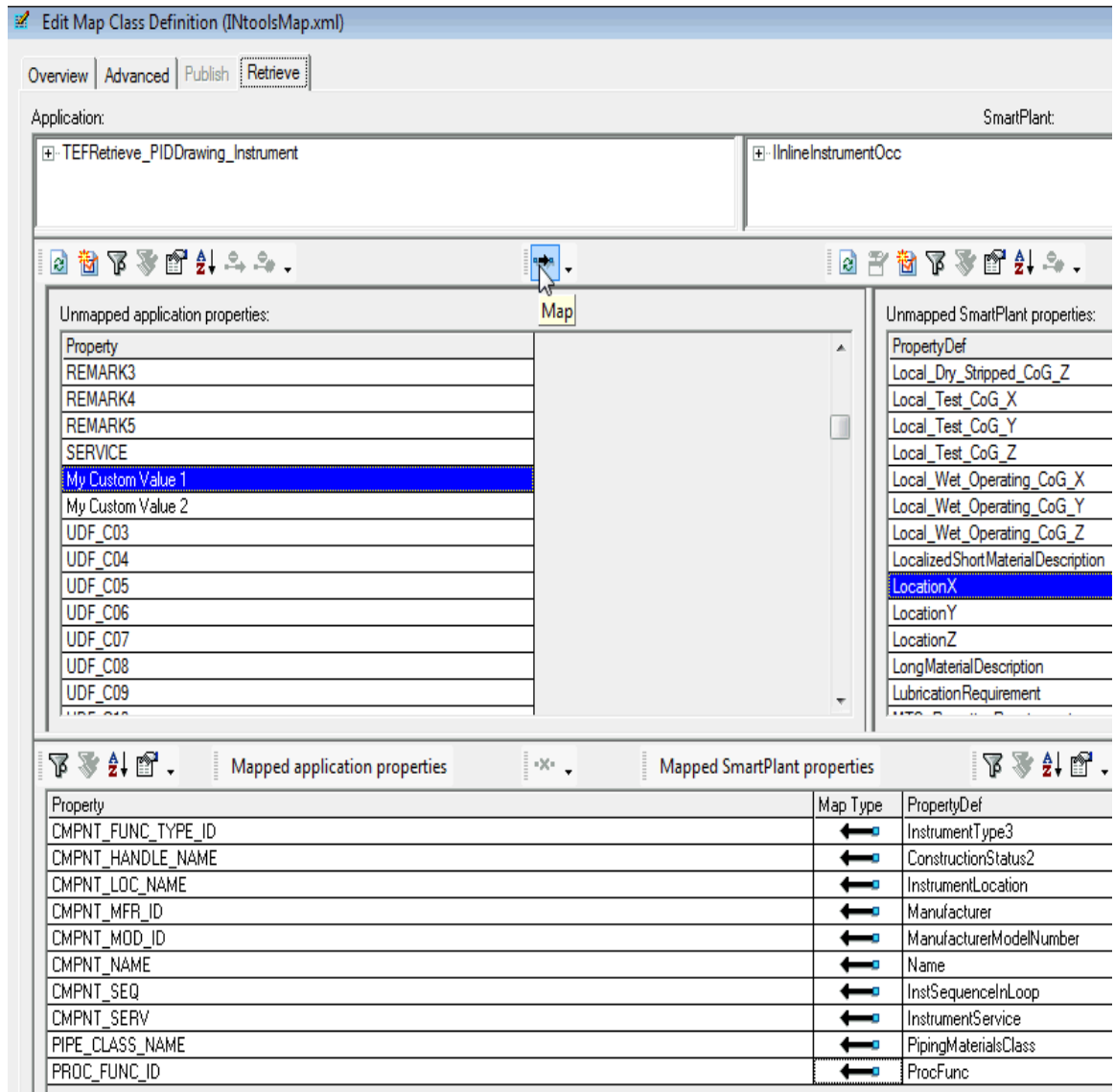
23. In the **Edit Map Class Definition** window, click the **Retrieve** tab.



24. From the **Unmapped application properties** pane, scroll down until you find the values that you added to the custom field.
25. Select the field that you want to map, then from the **Unmapped SmartPlant properties** pane, select the property that you want to map to.

TIP If you cannot find a suitable property in the SmartPlant Foundation schema to map to, you can create a new one.

26. Click the **Map** icon to map the selected properties.

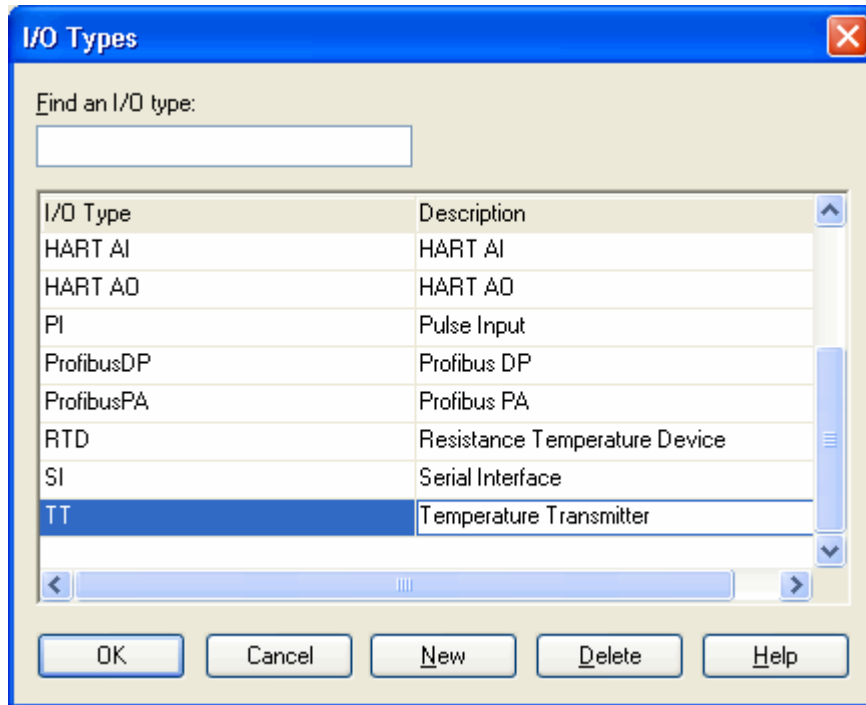


27. Repeat for other property values that you want to map.

28. Exit the Schema Editor, and click **Yes** in the message boxes when prompted to save changes.

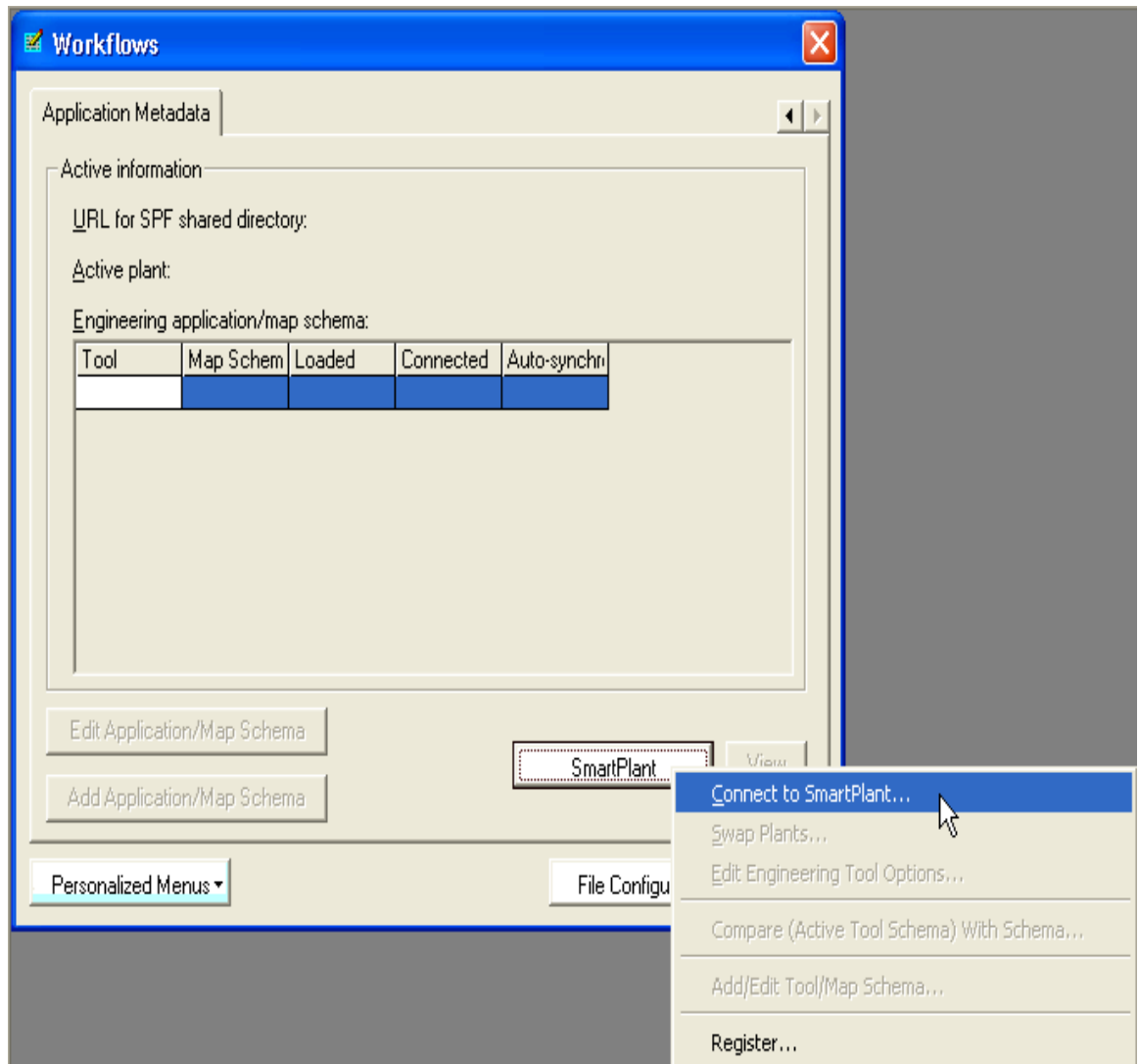
Synchronize an Enumerated List

1. Log on to SmartPlant Instrumentation.
2. Open the desired supporting table where you want to synchronize data, for example, if you want to add and map a new value for an instrument status, in the Instrument Index module, click **Tables > Instrument Statuses**.
3. Add a new value and, if desired, a description.



4. Click **Start > Intergraph SmartPlant Foundation > SmartPlant Schema Component > SmartPlant Schema Editor**.
5. In the **Workflows** window, click the **Application Metadata** tab.

6. Connect to the SmartPlant Foundation database as shown.



7. On the **SmartPlant Foundation URL** page of the **SmartPlant Registration Wizard**, type the node name and virtual directory of the SmartPlant Foundation database where you registered your plant. Use the following format: `http://<SPFServer>/<VirtualDirectory>`.

For example:

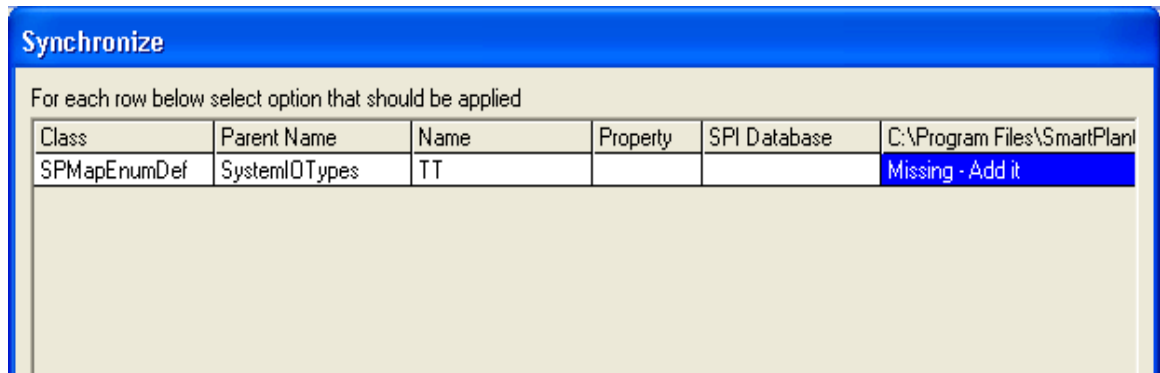
`http://<SPFServer>/SPFASP`

NOTES

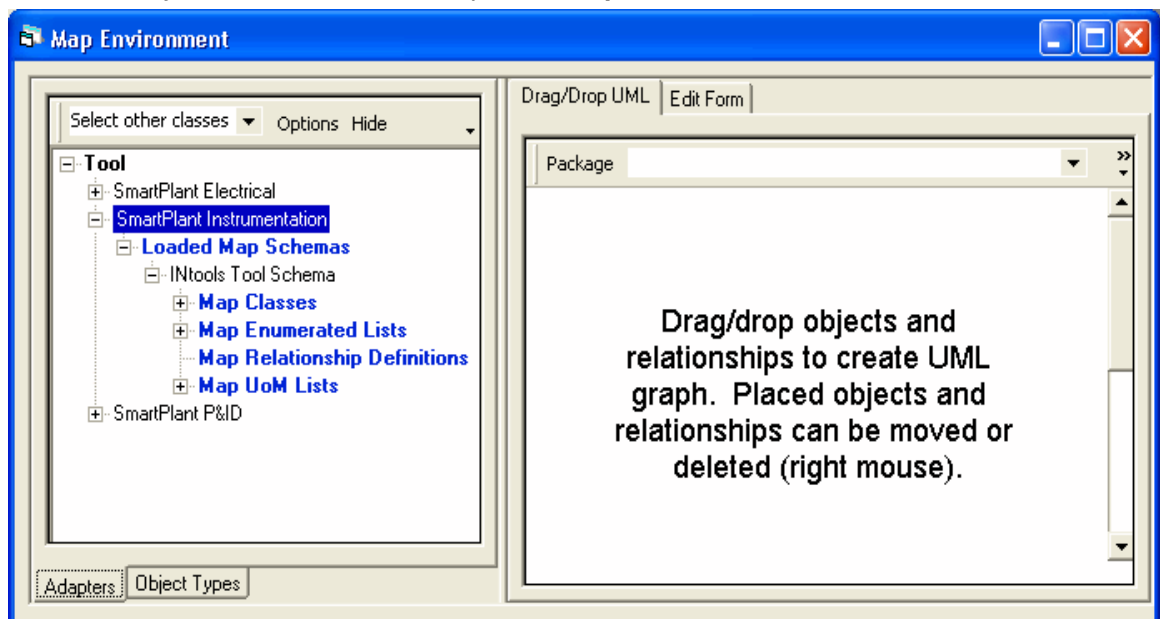
- Replace <SPFServer> with the name of your SmartPlant Foundation Web server.
- Replace <VirtualDirectory> with the name of the virtual directory for the SmartPlant Foundation Web Client. By default, the virtual directory for the first instance of the Web Client that you install is SPFASP. However, if you install multiple instances of the Web Client to connect to multiple databases, the virtual directory name may be different.

8. Click **Next**.
9. On the **SmartPlant Foundation Plant** page, from the **Plant name** list, select the SmartPlant Foundation plant in which you want to synchronize your data.
10. Click **Next**.

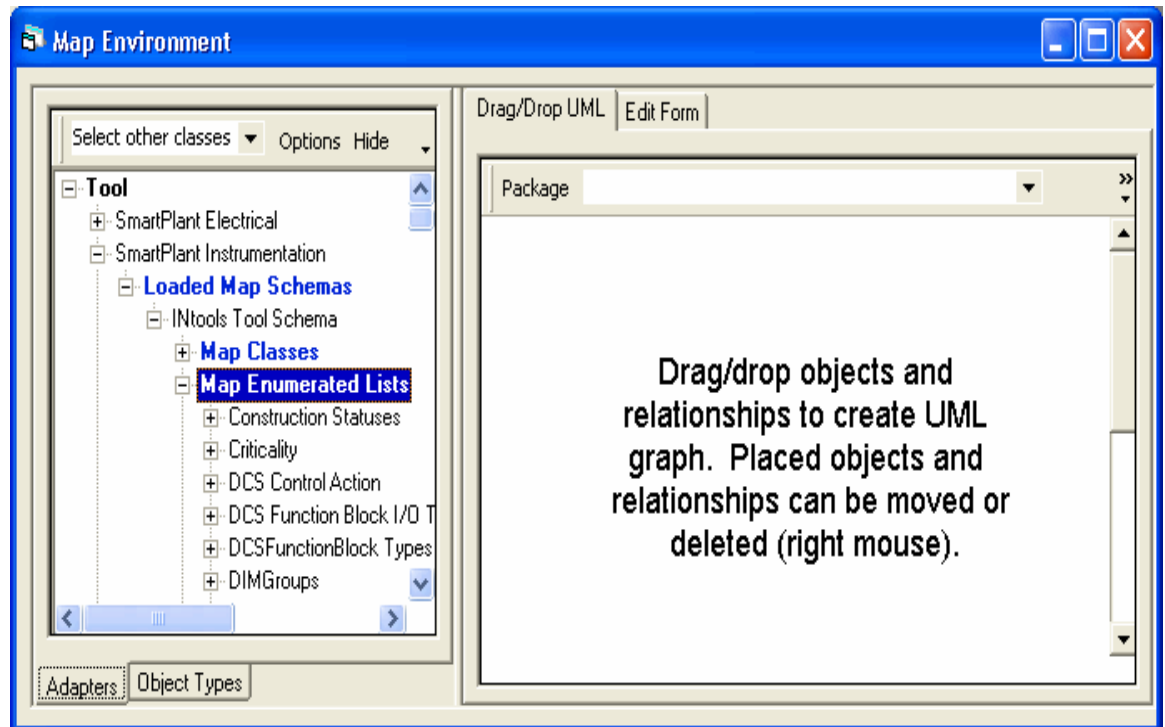
11. On the **Engineering Application Options** page, select from the **Engineering application/map schema** list the schema for the tool that you want to synchronize.
12. Under **Startup options**, select the **Load map schema** check box.
TIP For SmartPlant Instrumentation, the software automatically selects the **Connect to application schema** check box.
13. If needed, select the **Automatically synchronize schemas** check box.
TIP You can select more than one schema from the **Engineering application/map schema** list and specify the startup options. This allows you to load the map schema for each application and perform connection and synchronization as specified.
14. Click **Finish** to complete the connection and open the **Synchronize** dialog box, which displays the property selected by default for synchronizing in the map schema file. In this example, the map schema file name and path is C:\Program Files\SmartPlant\Instrumentation\XML\INtoolsMap.xml.



15. Leave the property selected because in this case, you want the software to synchronize the map schema file by updating it with the value from the application database.
16. Click **OK** to synchronize the data and open the **Map Environment** window.

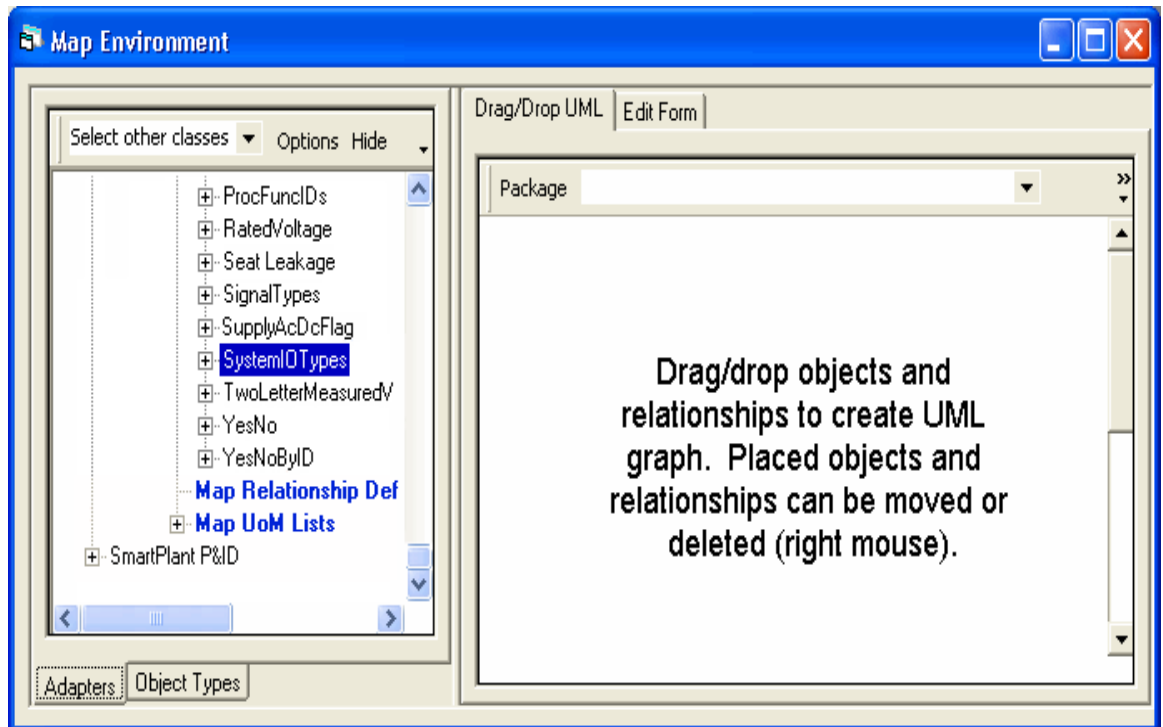


17. Expand the **SmartPlant Instrumentation** node by clicking the  icons.



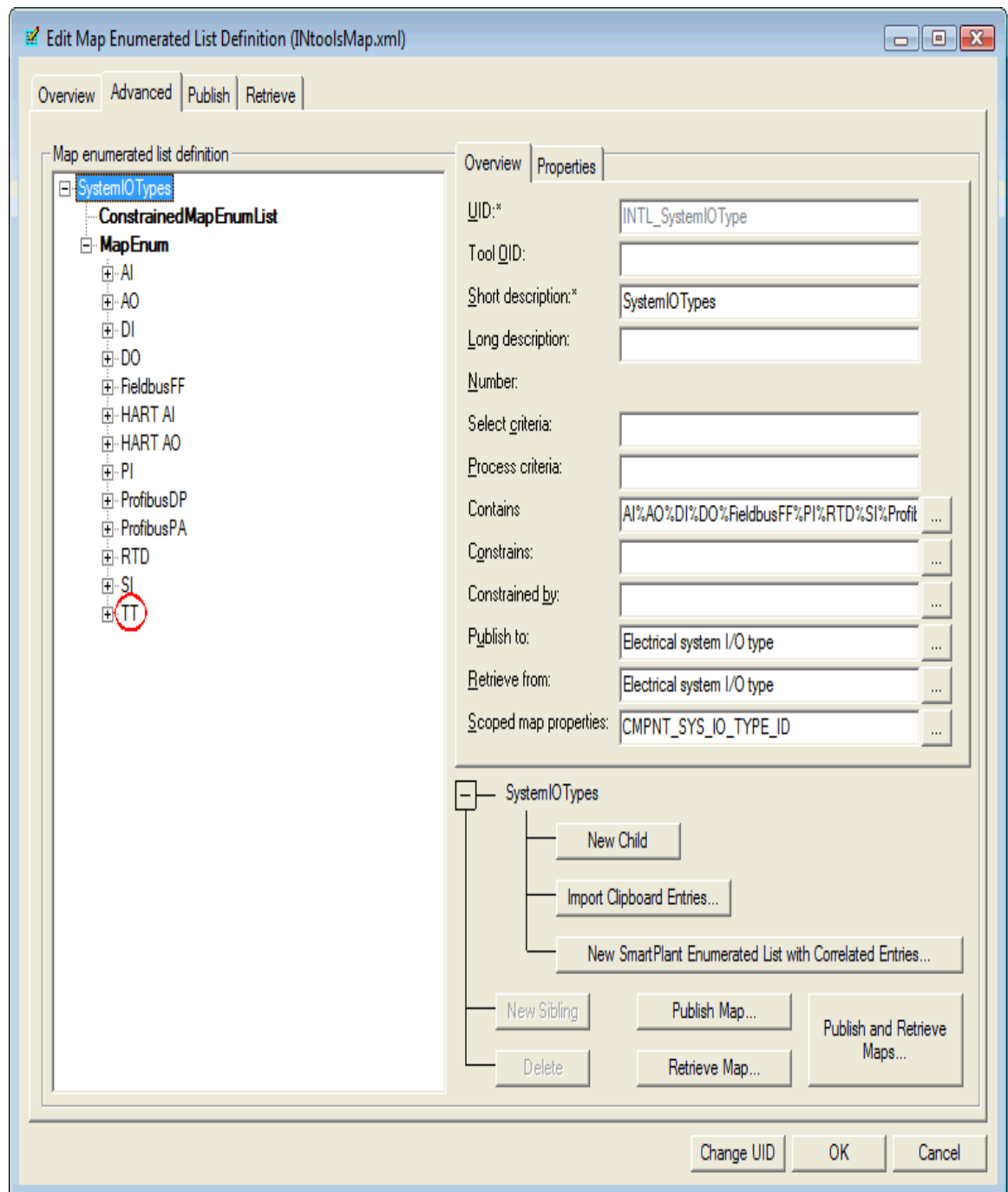
- **NOTE** The remainder of this procedure describes an example where you are going to map the new select list value that you defined to a map class for publishing I/O types. The actual map class that you select depends on how you want to map the fields that you defined, and on whether you choose to publish or retrieve the data.

1. Under the **Map Enumerated Lists** node, scroll down to the **SystemIOTypes** select list.

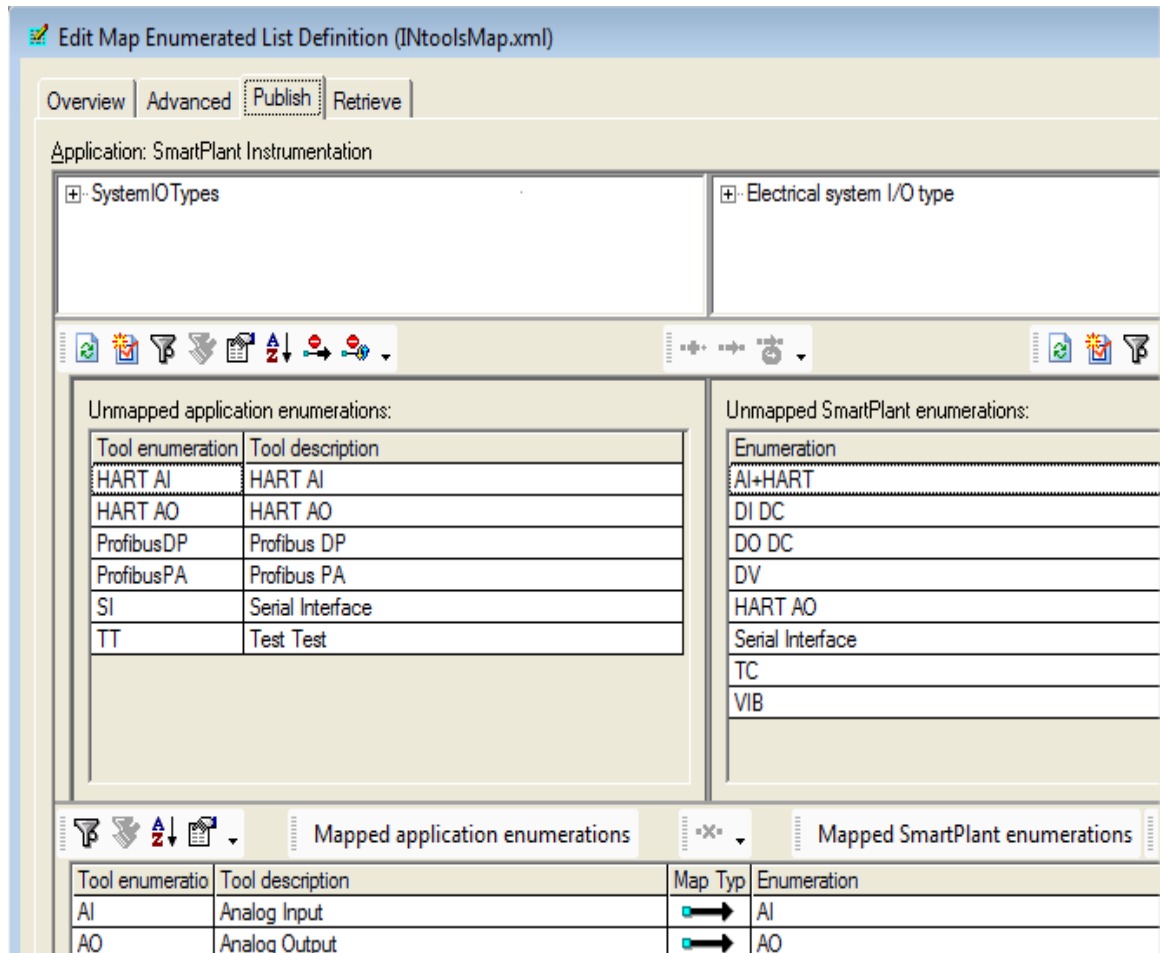


2. Right-click **SystemIOTypes**, and then, on the shortcut menu, click **Edit SystemIOTypes**.

3. In the **Edit Map Enumerated List Definition** window, click the **Advanced** tab to view the new select list value that you added.

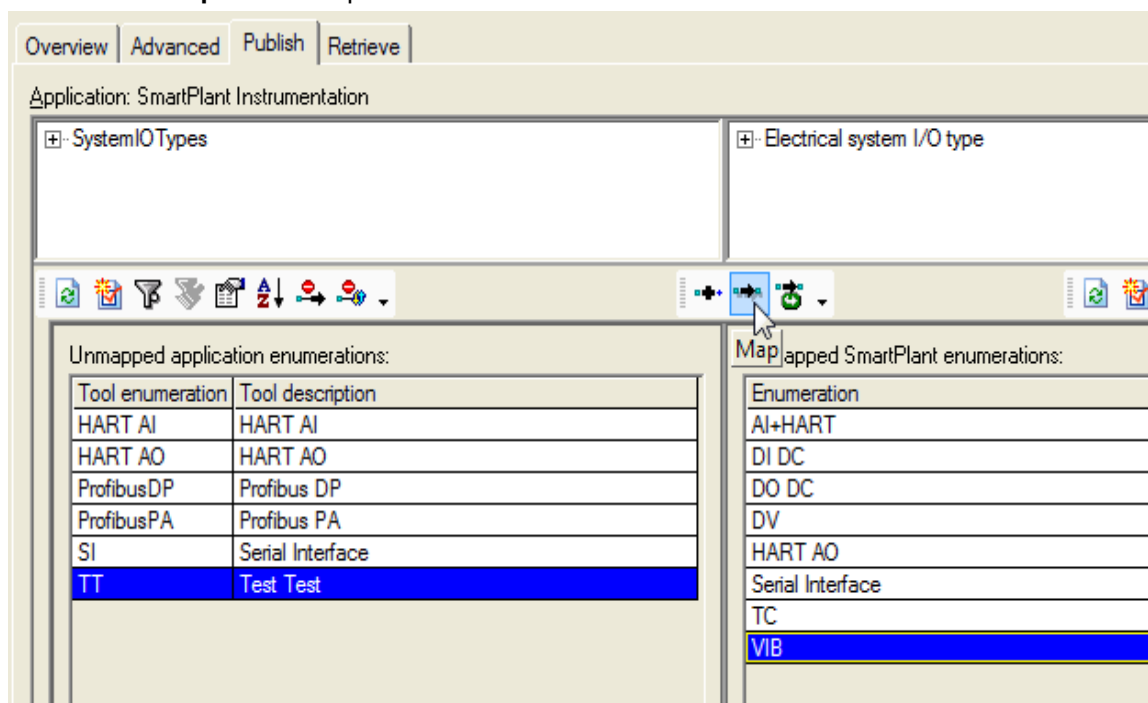


4. Click the **Publish** tab.



5. Do the following:
- In the **Unmapped application enumerations** pane, select **TT**.
 - In the **Unmapped SmartPlant enumerations** pane, select the enumeration that you want to map to (if you cannot find a suitable enumeration in the SmartPlant Foundation schema to map to, create a new one).

- c. Click the **Map** icon to map the selected enumerations.



The software moves the mapped enumerations to the **Mapped application enumerations** and **Mapped SmartPlant enumeration** panes.

Mapped application enumerations		Mapped SmartPlant enumerations	
Tool enumeration	Tool description	Map Type	Enumeration
AI	Analog Input	→	AI
AO	Analog Output	→	AO
DI	Digital Input	→	DI AC
DO	Digital Output	→	DO AC
FieldbusFF	Foundation Fieldbus	→	Fieldbus
PI	Pulse Input	→	PI
RTD	Resistance Temperature Device	→	RTD
TT	Test Test	→	VIB

6. Exit the Schema Editor, and click **Yes** in the message boxes when prompted to save changes.

Define a Schema for SmartPlant Instrumentation

1. In the Intools.ini file, add a new section, [FRAMEWORK], and type:
EnableTEFWizard=1
2. In the SmartPlant Instrumentation home folder, double-click the file spiscw.exe.
3. On the **Logon Information** dialog box, type your user name and password.
4. In the **SmartPlant Instrumentation Schema Configuration Wizard**, on the **Welcome** page, click **Next**.
5. Select a SmartPlant Instrumentation domain and click **Next**.
6. On the **Schema Options** page, select whether to create an entirely new schema definition or to modify an existing schema definition.
7. Do one of the following:
 - For a new schema, on the **Define New Schema Configuration** page, type a schema name and select the appropriate option according to whether the purpose of the schema is to publish or retrieve information. If you select to use the schema for publishing, type the name of the target application.
 - For an existing schema, on the **Select Schema** page, select the desired schema and click **Next**.

TIP When selecting an existing schema, the word 'publish' or 'retrieve' in parentheses indicates the purpose of the schema.

8. On the **Select Document Type** page, select from the list the document type that you want to add to the schema and click **Next**.

NOTES

- You can select only one document type at a time to add to the schema.
- Document types that have already been added to the schema are indicated with an asterisk.

9. On the **Select Object Types** page, select the objects, representing a class of items that you want to represent in the schema and click **Next**.

TIP All object types are available for any document type that you have selected, although it is recommended that you select related object types for a particular document type, for example, Cable, CableSet, Wire.

10. On the **Define Object Levels and Restrictions** page, select the level at which to set each object for determining parent-child relationships.

NOTES

- The highest level must always be 0.
- The software publishes or retrieves data for object types at each successive level associated with the object type at the next highest level. For example:

```
Line (level 0)
    Instrument (level 1)
        Piping port (level 2)
        Loop (level 2)
```

11. Select the check boxes as desired beside each object type to specify restrictions according to the requirements of the target application.
12. When done, click **Next**.
13. For a publish schema, if desired, on the **Define Filter Condition** page, specify a filter condition for each level 0 object type by selecting the object type and typing an appropriate SQL command.

14. When done, click **Next**.
15. On the **Select Object Interfaces** page, select for each object type the desired interfaces and click **Next**.
TIP Double-click an interface to view its properties.
16. On the **Completing the Schema Configuration Wizard** page, select the desired options and click **Finish**.
17. To prepare for the next stage of the mapping, select the **Export to tool schema** check box.

Define a Schema for SmartPlant Instrumentation - Custom Fields

1. In the SmartPlant Instrumentation home folder, double-click the file spiscw.exe.
2. On the **Logon Information** dialog box, type your user name and password.
3. In the **SmartPlant Instrumentation Schema Configuration Wizard**, on the **Welcome** page, click **Next**.
4. Select a SmartPlant Instrumentation domain and click **Next**.
5. On the **Schema Options** page, select **Change an existing schema definition**.
6. Do one of the following:
 - For a new schema, on the **Define New Schema Configuration** page, type a schema name and select the appropriate option according to whether the purpose of the schema is to publish or retrieve information. If you select to use the schema for publishing, type the name of the target application.
 - For an existing schema, on the **Select Schema** page, select the desired schema and click **Next**.

TIP When selecting an existing schema, the word 'publish' or 'retrieve' in parentheses indicates the purpose of the schema.

7. On the **Select Document Type** page, select from the list, the document type to which you want to add a custom field and click **Next**.

NOTES

- You can select only one document type at a time.
- Document types that have already been added to the schema are indicated with an asterisk.

8. On the **Select Object Types** page, select the objects, representing a class of items, that you want to represent in the schema, and click **Next**.

TIP All object types are available for any document type that you have selected, although it is recommended that you select object types related to a particular document type, for example, Cable, CableSet, Wire.

9. On the **Define Object Levels and Restrictions** page, select the level at which to set each object for determining parent-child relationships.

NOTES

- The highest level must always be 0.
- The software publishes or retrieves data for object types at each successive level associated with the object type at the next highest level. For example:

```
Line (level 0)
  Instrument (level 1)
    Piping port (level 2)
    Loop (level 2)
```

10. Select the check boxes as desired beside each object type to specify restrictions according to the requirements of the target application, and click **Next**.
11. For a publish schema, if desired, on the **Define Filter Condition** page, specify a filter condition for each level 0 object type by selecting the object type and typing an appropriate SQL command, and click **Next**.
12. On the **Select Object Interfaces** page, select for the desired object type, a custom-field interface, click **Add**, and click **Next**. For example, for the object type **Controller**, you can select **IUnitUDF**, or **IStripUDF**.
TIP Double-click an interface to view its properties.
13. On the **Object Interfaces Properties** page, select the desired interface properties and click **Add**. Once you finished adding all the desired properties, click **Next**.
14. On the **Completing the Schema Configuration Wizard** page, select the desired options and click **Finish**.
15. To prepare for the next stage of the mapping, select the **Export to tool schema** check box.

Export a New Schema Configuration

1. In the SmartPlant Instrumentation home folder, double-click the file SPIScw.exe.
2. On the **Logon Information** dialog box, type your user name and password.
3. In the Export Schema Configuration Utility, beside the **Source tool schema** field, click the ellipsis button  and navigate to the INtoolsMap.xml file.
4. Beside the **Target tool schema** field, click the ellipsis button  and specify the name of the .xml file that you want to use as the target.
IMPORTANT After testing the updated schema to ensure that it works correctly, you must rename the target file to 'INtoolsMap.xml' to enable the software to publish the data successfully.
5. Click **Connect to SmartPlant Instrumentation Domain**.
6. On the **Logon** dialog box that opens, select the desired domain.
7. From the **Object schema** list, select the object schema that you want to export.
8. To export the object schema to the target tool schema, click **Export**.

Define and Map DDP Data

The following procedure is used when you want to publish instruments that have dimensional data but where those instruments are not included in the schema. In an integrated environment, the software supports publishing of dimensional data sheets for certain dimensional groups only. For the full list of supported dimensional groups, see *List of Publishable Dimensional Groups* (see "Publishable Dimensional Groups" on page 474).

NOTE On a Vista operating system with User Access Control turned on, in order to publish a DDP document through SmartPlant Foundation, the output document folder cannot be any sub-folder under either the 'Program Files' or 'Windows' folders.

1. The SmartPlant 3D user must define a symbol in the catalog for each instrument that is going to be published from SmartPlant Instrumentation.
2. The SmartPlant 3D user must inform the SmartPlant Instrumentation user which DDP attributes for the instrument need to be published.
3. Add the appropriate DDP attributes to the SmartPlant schema using the Schema Editor.
4. The SmartPlant 3D user must map the DDP attributes to the SmartPlant schema.
5. Define the appropriate DDP attributes for the instrument in SmartPlant Instrumentation.

6. Define the mapping between SmartPlant Instrumentation and the SmartPlant schema.

Schema Configuration Wizard

The Schema Configuration Wizard enables you to define, modify, or delete schemas that you use to define the data set for publishing or retrieving. A schema definition consists of the schema name and the target application. You can specify one or more document types for each schema, and in the target application, you retrieve or publish data for individual documents based on a single document type. After you generate a schema, you need to map it to the .xml file used for publishing or retrieving your data.

Welcome to the SmartPlant Instrumentation Schema Configuration Wizard

This page appears when you open the Wizard. Click **Next** to continue.

Select Domain

Select the SmartPlant Instrumentation domain for which you want to define a new schema for publishing or retrieving data, modify an existing schema, or delete an existing schema.

Schema Options

Select the desired schema option. If you have System Administrator rights, you can also select to change metaschema definitions.

Define New Schema Configuration

Ensure that the schema name that you enter is unique for the domain. If the schema is intended for publishing data, you must type a target application name that matches the name of a supported application in an integrated environment.

Select Schema

Select the existing schema that you want to modify or delete. Note that there may be more than one schema for a particular application and that separate schemas are defined for publish and retrieve operations.

Select Document Type

Examples of document types are loops, cables, or PBS Documents. The document type that you select is for recognition by the target application. You may add as many document types to the schema as desired, however, you can select only one document type at a time for addition to the schema. To add another document type, run the wizard again after completing the current definition.

Select Object Types

All object types are available for selection regardless of the document type that you selected; nevertheless it is recommended that you select object types that are appropriate for the specified document type.

Define Object Levels and Restrictions

The options on this page apply to schemas used for retrieving data only. For objects that you want to be at the highest level, you must specify a value of 0 for the level. The software retrieves or publishes data for objects at lower levels based on the appropriate object at the next highest level. Select restrictions for the objects according to the requirements of the target application, for example, you may want to specify a restriction that does not allow the creation or deletion of instruments. Specifying a restriction generates a manual task for the restricted activity in the To Do List after retrieval.

Define Filter Condition

Filter conditions apply to schemas used for retrieving data only. The software retains the filter definition that you make for each object. Click **Validate** to verify that the syntax of the filter condition is correct.

Select Object Interfaces

On this page, after you select an object type, highlight an object interface under **Available interfaces** and click **Add** to select it for the object type. You cannot perform multi-selection of interfaces, therefore you must repeat this action for each interface that you want to add. Each interface consists of a group of related engineering properties — these properties are hard-coded.

Select Interface Properties

On this page, after you select an object type, highlight an object interface under **Available interfaces** and click **Add** to select it for the object type. You cannot perform multi-selection of interfaces, therefore you must repeat this action for each interface that you want to add. Each interface consists of a group of related engineering properties — these properties are hard-coded.

Completing the Schema Configuration Wizard

The following options are available:

- To save the schema definitions to the database, select **Save schema definitions** and then click **Finish**.
- To discard the current definitions and start again, select **Restart wizard to make another modification** and then click **Finish**. If you select this option with one or both check boxes selected, you can still create an SQL file or export the definitions to the tool schema.
- To perform the mapping directly, select **Export to tool schema**.
- To save the definitions in an SQL file that you use to generate the mapping to the XML component manually, select **Create SQL file**. The software saves the SQL file in the SmartPlant Instrumentation home folder.

Export Schema Configuration Utility

The Export Schema Configuration Utility enables you to copy existing map file data into a new class definition so that the interfaces belonging to that class are exposed in the tool schema.

Source tool schema — The name and path of the XML file that you use as the map source. Click the ellipsis button  to navigate to the desired location.

Target tool schema — The name and path of the XML file that you will obtain as the output. Click the ellipsis button  to navigate to the desired location.

Connect to Domain — Opens the **Logon** dialog box where you select the desired SmartPlant Instrumentation domain.

Object schema — Select from the list the object schema that you want to export.

Export — Exports the selected object schema to the target tool schema.

Publishing Documents in an Integrated Environment

In an integrated environment, the authoring tools share data and relationships when you publish documents containing the data and relationships. The publishing process involves selecting a document to publish, assigning it to a workflow when necessary, and specifying a version and revision of the document if specified in SmartPlant Foundation. For most documents, the software also publishes the data that is associated with the document when you publish.

The authoring tools (SmartPlant P&ID or SmartPlant Instrumentation, for instance) publish data in .xml format. All leading and trailing spaces are trimmed from all strings and from all values without units. These spaces will not appear in the published data file. The software then loads the data from the .xml files to the SmartPlant Foundation database. After the data is loaded into SmartPlant Foundation, you can retrieve the data from into other authoring tools.

When you publish documents, the software does the following things:

- Creates a new master document and the first revision in SmartPlant Foundation the first time that you publish a particular document. From that point on, the software creates new versions and revisions each time that you publish the document. The software relates revisions to the master document. You can publish subsequent revisions into a workflow, which can be a different workflow from the original publish action. Changes in the document status of a related revision change the status of the subsequently published versions and revisions of the document.
- Publishes a visual representation of the document that you can view without the authoring tool. For many applications, this is an Intergraph proprietary file, called a RAD file. The viewable file can also be an Excel workbook or another viewable file type, such as .pdf or .doc. Users can review and edit the visual representation of the document using SmartPlant Markup.
- Publishes associated data, depending on workflow approval. If the data is approved and loaded, it is used for reporting and subsequent retrieval by downstream applications. The software publishes only meaningful engineering data. The published data is not enough to recreate the document in the original authoring tool.
- The software publishes some document types without the associated data, such as reports from authoring tools (for example, line lists in P&ID). You can submit documents published without data to workflows just like documents with data. The document types and data that you can publish depend on the authoring tool that you use.

For more information about revisions and versions, see the *SmartPlant Foundation Web Client User's Guide*.

Reasons to Publish

You can publish documents and associated data for several reasons:

- To exchange and enhance data among tools, to avoid creating data multiple times in multiple authoring tools
- To report on common data that originates in multiple tools
- To provide enterprise-wide accessibility to published documents
- To manage change, including workflow history and document revision management

You can also publish documents to share information with users in other tools without going through a formal workflow. To share data, you can publish a document to a **For sharing** workflow that has only a load step so that the data is loaded into SmartPlant Foundation as soon as you publish the document.

You can also publish a document by not assigning the document to a workflow, but rather by using the default workflow from SmartPlant Foundation. When you do not select a workflow for a document during publishing, the SmartPlant Loader loads the document into SmartPlant Foundation as soon as it reaches the top of the Loader queue.

Document Types for Publishing

Each authoring tool publishes different documents and data. The published PBS document contains information about the physical plant with a structure consisting of plants, areas, and units. The default structure is plant/area/unit, but you can define a custom hierarchy in the Schema Editor. When a PBS document is published from SmartPlant Foundation, the authoring tools are notified about the plant, areas, and units that need to be created in each authoring tool. The project breakdown structure, project definition document, and project list contain information about projects and their statuses.

The project breakdown structure contains a single project and the hierarchy of contracts under that project in a plant/project structure. The project definition document contains information for a single project that needs to be created in the authoring tool. The project list contains a list of all projects in a plant, and it is used by those authoring tools that create all projects at one time.

NOTE The plant breakdown structure and project breakdown structure used in the authoring tools must match the structure in SmartPlant Foundation for publishing from the authoring tools and object correlation to work correctly.

In SmartPlant Instrumentation, the following documents can be published out of the box. Your administrator can configure other documents for publish.

- Instrument Indexes (including instruments, loops, equipment components, and control system functions)
- Browsers
- Electrical Tag Signal Lists
- Instrumentation Requiring Power Supply
- Enhanced SmartLoop Reports
- Instrument Specification Sheets
- Instrument Process Data Sheets
- Dimensional Data Sheets (DDP)
- Select Wiring Reports

Publishing Files without Data

You can also browse to other file types on the file system, such as Microsoft Word or Excel files, or SmartSketch® files, in order to publish them. These documents are always published without data. The primary reasons to publish documents without data are that the SmartPlant Foundation Change Management functionality can manage document changes and reviews using workflows and that you can view the documents electronically.

NOTE When you publish data from an authoring tool, you may not be able view all the properties that you published in the SmartPlant Foundation client. You can customize view definitions to allow you to see additional properties. For more information about defining view definitions in the SmartPlant schema, see *Working with View Definitions* and *Create a View Definition* in the *Schema Editor User's Guide*. For further assistance with visualizing data in SmartPlant Foundation, contact Intergraph Customer Support.

See Also

Publish Documents from SmartPlant Instrumentation (on page 477)

Find Documents to Publish from SmartPlant Instrumentation (on page 481)

Preliminary Settings for Publishing from SmartPlant Instrumentation

To ensure that your documents are published correctly, check that you have specified the following settings, where relevant, for the documents you intend to publish:

- When publishing data from different units, you must specify separate document numbers and sets of revisions for each unit. To do so, open the `Intools.ini` file, and under the `[Index]` section, type the following line: `DrawingPerLevel=Y`
- To specify the published format of graphical reports (native or PDF), on the **Preferences** dialog box, under **SmartPlant Integration > General**, select one of the following options from the **Graphical report format** list:
 - **Native (brw, spd, ssf)** — Generates published reports in native format. Select this option if you want to generate reports for which the title block issue data is updated in SmartPlant Foundation. The native format depends on the report type: for Browser, Instrument Index, and Wiring reports, the report file extension is `.brw`; for process data sheets, the report file extension is `.spd`; for spec sheets, the report file extension is `.ssf`. Note that this option does not apply to DDP reports, and if selected, DDP reports will be generated as PDF files only.
 - **PDF** — Generates published reports in `.pdf` format.
 - **Both** — Generates published reports in both native and `.pdf` formats.
 - **None** — Disables publishing of view files when you publish documents.
- In order to publish successfully wiring reports where a choice exists for the revision management settings, in the Administration module, the Domain Administrator needs to open the **Report Management** dialog box and change the **Revision Management** settings for these reports from **Per Item** to **Per Document**. For more information, see *SmartPlant Instrumentation Administration Help, Domain Administration > Define Report Revision Management Settings*.

Publishable SmartPlant Instrumentation Documents

The following table indicates the types of documents that are available for publishing and the characteristics of the published documents.

Document	Accessed From	Published Output	Graphical Report Format	Notes
All types	Main SmartPlant Instrumentation window (no modules open)	Depends on document	Depends on document	Select the desired documents using the <i>Document Selection Wizard</i> (on page 482).
All Instruments and loops in the unit	Instrument Index Standard Browser view	Data and view file	Native (brw) or PDF	
Electrical power elements	Electrical Power Element Browser (in the Browser module)	Data only	–	
Electrical tag browser	Electrical Tag Browser (in the Browser module)	Data only	–	
View file for browser	All other browser views (in the Browser module)	View file only	Native (brw) or PDF	
Specification sheet	Open instrument specification sheet	View file only	Native (ssf) or PDF	
Process data sheet	Open process data sheet	View file only	Native (spd) or PDF	
Loop drawing	Loop	View file only	Native (sma) or PDF	You must generate the drawing as an Enhanced SmartLoop report and make at least one revision.
Dimensional data sheet	Open dimensional data sheet	Data and view file	PDF only	Only dimensional data sheets belonging to certain groups are publishable. For details, see <i>Publishable Dimensional Groups</i> (on page 474).
Wiring reports		View file only	Native (brw) or PDF	The following wiring reports can be published: - Panel-Strip With Adjacent Connections - Panel Strip Without Adjacent Connections (Style 2)

Document	Accessed From	Published Output	Graphical Report Format	Notes
				- I/O Tag Assignment (Wiring) - I/O Map
Wiring Equipment Connections	DCS panel or PLC panel	View file only	Native (sma) or PDF	You must generate the drawing as an enhanced report and make at least one revision. To publish the document, use Find Documents to Publish .

NOTES

- You set the graphical report format for view files on the SmartPlant Instrumentation **Preferences** dialog box, under **SmartPlant Integration > General**.
- In order to publish successfully the 'Panel-Strip With Adjacent Connections' and 'Panel Strip Without Adjacent Connections (Style 2)' wiring reports, in the Administration module, the Domain Administrator needs to open the **Report Management** dialog box and change the **Revision Management** settings for these reports from **Per Item** to **Per Document**. For more information, see *SmartPlant Instrumentation Administration Help, Domain Administration > Define Report Revision Management Settings*.
- The filter conditions that you apply determine the scope of data that is published from browsers.
- Data in custom browsers can be published if the appropriate document types are mapped between the tool schema and SmartPlant schema. For information about mapping document types, see *Schema Configuration Wizard* (on page 468).

Publishable Dimensional Groups

The SmartPlant Instrumentation dimensional groups in the list are those that also appear in the SmartPlant schema, in INtoolsMap.xml, and in SmartPlant 3D. Only dimensional data sheets for instruments that use these groups will publish successfully. Other dimensional groups in SmartPlant Instrumentation are currently not supported for publishing.

Group	Description
IA1	Annubar Type 1
IA2	Annubar Type 2
ICM1	Coriolis Flowmeter Type 1
ICM2	Coriolis Flowmeter Type 2 Liquid
ICM3	Coriolis Flowmeter Type 2 Gas
ICM4	Coriolis Flowmeter Type 3 Liquid
ICM5	Coriolis Flowmeter Type 3 Gas
IDCO	Orifice_Double Chamber Fitting
IDL1C	Valve_Rotary Diaph. Act. Pos C1
IDL1D	Valve_Rotary Diaph. Act. Pos D1

Group	Description
IDL4C	Valve_Rotary Diaph.Act.Pos C4(Vert.Line)
IDL4D	Valve_Rotary Diaph.Act.Pos D4(Vert.Line)
IDR1A	Valve_Rotary Diaph. Act. Pos A1
IDR1B	Valve_Rotary Diaph. Act. Pos B1
IDR4A	Valve_Rotary Diaph.Act.Pos A4(Vert.Line)
IDR4B	Valve_Rotary Diaph.Act.Pos B4(Vert.Line)
IEAM1	Valve_Electric Actuator Type 1
IEAM2	Valve_Electric Actuator Type 2
IEAM3	Valve_Electric Actuator Type 3
IEAM4	Valve_Electric Actuator Type 4
IEAM5	Valve_Electric Actuator Type 5
IIO L	Orifice_Integral Type 2
IIO R	Orifice_Integral Type 1
IIV	Insert Venturi
IKG1	Knife Gate Valve Typ 1_Piston Actuator
IKG2	Knife Gate Valve Typ 2_Piston Actuator
ILSV	Long or Short Venturi
IMFM1	Magnetic Flowmeter Type 1
IMFM2	Magnetic Flowmeter Type 2
IMFM3	Magnetic Flowmeter Type 3
IMFM4	Magnetic Flowmeter Type 4
IMOP1	Meterrun_Orifice Flanges & Plate
IMRSV	Meterrun_Short Venturi
IOP	Orifice Plate
IPDA1	Valve_Double Acting Dual Cyl Act. TYP 1
IPDA2	Valve_Double Acting Sngl Cyl Act. TYP 2
IPDA3	Valve_Double Acting Piston Act. TYP 3 FC
IPDA3A	Valve_Double Acting/Sprg Rtrn Act. 90 RS
IPDA4	Valve_Double Acting Sngl. Piston Act. FO
IPDA4A	Valve_Double Acting/Sprg Rtrn Act. 90 LS
IPDA5	Valve_Double Acting Dual Cyl Act TYP 5
IPL1C	Valve_Rotary Piston Act. POS C1

Group	Description
IPL1D	Valve_Rotary Piston Act. POS D1
IPL4C	Valve_Rotary Piston Act.POS C4(Vert.Line)
IPL4D	Valve_Rotary Piston Act.Pos D4(Vert.Line)
IPR1A	Valve_Rotary Piston Act. POS A1
IPR1B	Valve_Rotary Piston Act. POS B1
IPR4A	Valve_Rotary Piston Act.POS A4(Vert.Line)
IPR4B	Valve_Rotary Piston Act.POS B4(Vert.Line)
IPSR1	Valve_Spring Return Piston Act. Typ1 FC
IPSR2	Valve_Spring Return Piston Act. Typ2 FO
IPSR3	Valve_Spring Return Piston Act. Typ3 FC
IPSR4	Valve_Spring Return Piston Act. Typ4 FO
IR1	Rotameter Type 1
IR2	Rotameter Type 2
IR3	Rotameter Type 3
IR4	Rotameter Type 4
IR5	Rotameter Type 5
IR6	Rotameter Type 6
IR7	Rotameter Type 7
IR8	Rotameter Type 8
IR9	Rotameter Type 9
IREG1	Regulator Type 1
IREG2	Regulator Type 2
IREG3	Regulator Type 3
IREG4	Regulator Type 4
IREG5	Regulator Type 5
IRVT3	Relief Valve Type 3 (Pilot)
IRVT4	Relief Valve Type 4 (Pilot)
IRVT7	Relief Valve Type 7 (Specials)
IRXPA	Valve_Rack & Pinion Actuator
ISSDA	Valve Angle_Linear Diaphragm Actuator
ISSDS	Valve Linear Diaphragm Actuator
ISSPS	3 Way Valve_Linear Piston Actuator

Group	Description
ITM	Turbine Meter
IVM1	Vortex Flowmeter Type 1
IVM2	Vortex Flowmeter Type 2
IVM3	Vortex Flowmeter Type 3
IVM4	Vortex Flowmeter Type 4_Dual Head
IWFE	Wedge Flow Element
SDG1	Diaphragm Globe Valve
SDR1	Diaphragm Rotary Valve
SMISC1	Miscellaneous Inline Instruments
SMR1	Meter run
SOP1	Orifice Plate or Rupture Disc
SP1	Piston Globe or Rotary Valve
SPR1	Piston Rotary Valve
SREG1	Regulator
SRV1	Relief Valve

Publish Documents from SmartPlant Instrumentation

CAUTION

- When publishing documents, select the lowest plant hierarchy level from a plant hierarchy, for example, a unit.
- After you start to publish documents from an Instrument Index Standard Browser view, you should not change the default view. Changing the view can result in incorrect revision numbers and inconsistencies between the graphical and XML output files.

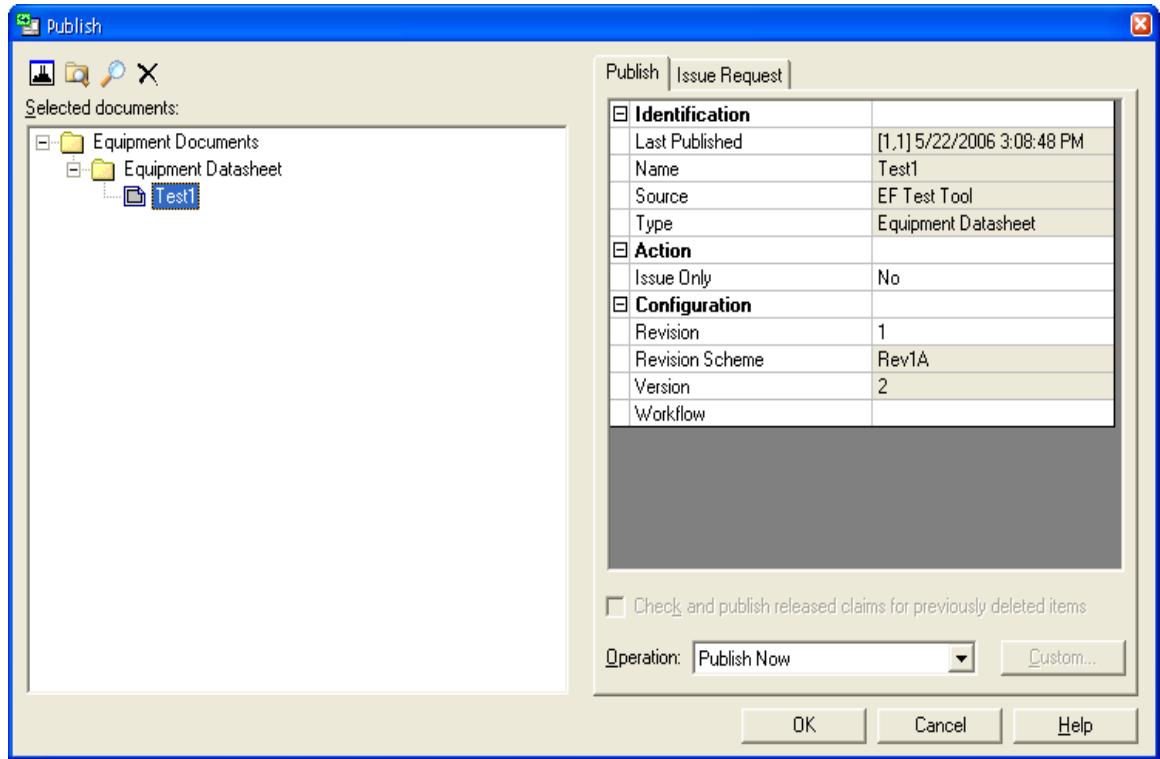
IMPORTANT

- Before you can publish SmartPlant Instrumentation engineering documents, you must make a revision for each document you want to publish. The software finds only those documents for which you have made revisions. If you have made several revisions for one document, the software finds the document containing the most recent revision.
 - To publish a loop drawing, you must have first generated the drawing as an Enhanced SmartLoop report and made at least one revision.
1. Select a document for publishing. For more details of suitable documents for publishing, see *Publishable SmartPlant Instrumentation Documents* (on page 473).
 2. Click **SmartPlant > Publish**.

NOTES

- This command is available only if you have registered the active plant using the SmartPlant Registration Wizard.
- If you logged onto SmartPlant Instrumentation with a user name that is not defined in the integrated environment, you are prompted to log on when you use this command.

- The documents that appear in the **Selected documents** list on the **Publish** dialog box when it first appears are documents that were selected within SmartPlant Instrumentation before you accessed the **Publish** command.



3. Add any additional documents to the **Selected documents** list by clicking the **Engineering Tool**, **File System**, or **Find** toolbar buttons and choosing other documents to publish.
4. In the **Document Selection Wizard**, on the **Select Document Type** page, select the check boxes for the types of documents you want to publish.
5. Click **Next**.
6. On the **Select Unit** page, navigate to the lowest level plant hierarchy item, such as a unit, from which you want to publish documents.

TIPS

- Double-click the icons to expand the plant hierarchy.
 - The **Next** command is enabled only after you select a unit.
7. Click **Next**.
 8. Depending on your document type selection, do the following to select engineering documents on each **Select** page that opens:
 - a. Specify search parameters as necessary, and then click **Find**.
 - b. In the **Search results** data window, select the rows for the documents that you want to publish, and then click **Next**.

NOTE If you select the **Instrument Index** check box on the **Select Document Type** page, the software automatically finds the Instrument Index document that exists in the <unit>.

9. On the **Document Selection Summary** page, review your selections, and click **Finish** to exit the **Document Selection Wizard** and return to the **Publish** dialog box.

TIP To redefine your selections, click **Back**.

10. On the **Publish** dialog box, review the documents that you want to publish and edit information as necessary.

TIP When multiple documents are selected, only property values shared by all the selected documents appear in the table. Changing a value in the table changes that value for all of the selected documents.

11. From the **Operation** list, specify the desired method of publishing:

- Select **Publish** to immediately start the publishing process as soon as you click **OK**.
- Select **Background publish** to publish the selected documents immediately as a separate process, allowing you to perform other tasks at the same time. When you use this feature, an e-mail message alerts you when the process is complete.
- Select **Scheduled publish** to indicate that the publish process should be run in batch mode, if the authoring tool supports scheduled batch publishing.

12. Click **OK** to complete the publish operation.

NOTE When the publish is complete, a dialog box appears indicating whether the publish operation was completed successfully or with errors. If the **View Log** button on the dialog box is enabled, you can click it to view messages concerning the operation. These may be errors, warnings or informational messages.

See Also

Retrieve Documents to SmartPlant Instrumentation (on page 491)

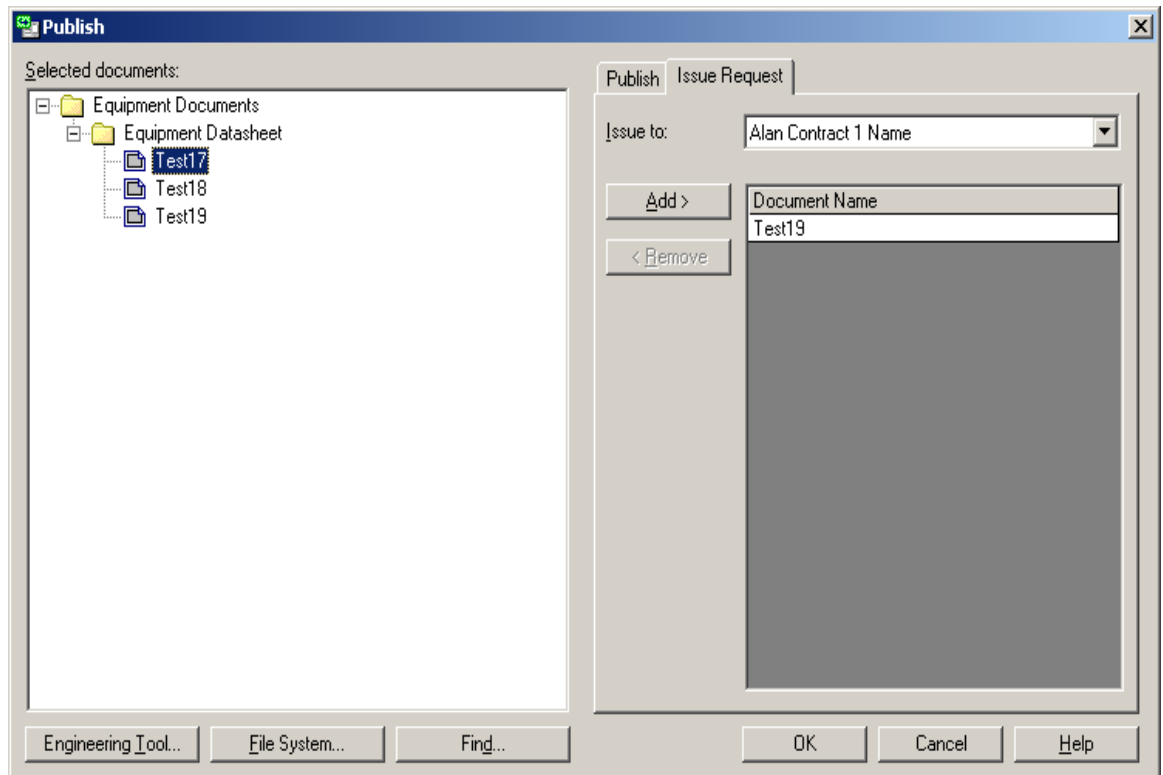
Issue Request Documents from SmartPlant Instrumentation

1. Select a document. For more details of suitable documents for publishing, see *Publishable SmartPlant Instrumentation Documents* (on page 473).
2. Click **SmartPlant > Publish**.

TIPS

- If you logged onto SmartPlant Instrumentation with a user name that is not defined in the integrated environment, you are prompted to log on when you use this command.
- The documents that appear in the **Selected documents** list on the dialog box when it first appears are documents that were selected within SmartPlant Instrumentation before you accessed the **Publish** command.

- Click the **Issue Request** tab.



- In the **Issue to** box, select the contract to which you want to assign the document or documents.
- To add any additional documents to the **Selected documents** list, click the **Engineering Tool** button.
- In the **Document Selection Wizard**, on the **Select Document Type** page, select the check boxes for the types of documents you want to publish.
- Click **Next**.
- On the **Select Unit** page, navigate to the lowest level plant hierarchy item, such as a unit, from which you want to publish documents.

TIPS

- Double-click the icons to expand the plant hierarchy.
- The **Next** command is enabled only after you select a unit.

- Click **Next**.
- Depending on your document type selection, select engineering documents on each **Select...** page that opens as follows:
 - Specify search parameters, as necessary, and then click **Find**.
 - In the **Search results** data window, select the rows for the documents that you want to publish, and then click **Next**.

NOTE

If you select the **Instrument Index** check box on the **Select Document Type** page, the software automatically finds the Instrument Index document that exists in the unit.

- On the **Document Selection Summary** page, review your selections, and click **Finish** to exit the **Document Selection Wizard** and return to the **Publish** dialog box.

TIP

To redefine your selections, click **Back**.

12. Click **OK** to publish the issue relation.

See Also

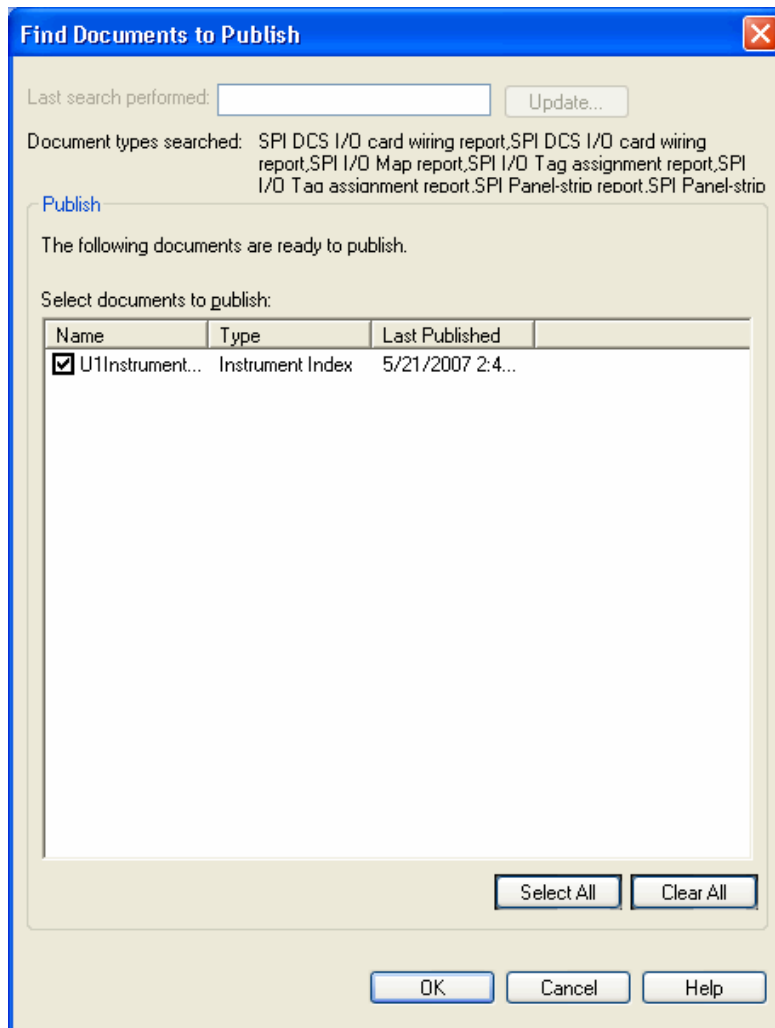
Retrieve Documents to SmartPlant Instrumentation (on page 491)

Find Documents to Publish from SmartPlant Instrumentation

1. Click **SmartPlant > Find Documents to Publish**.

TIPS

- This command is available only if you have registered the active plant using the SmartPlant Registration Wizard.
 - This feature is also available by clicking **Find**  on the **Publish** dialog box.
 - The **Find Documents to Publish** command determines which documents need to be published or re-published and displays the results on the **Find Documents to Publish** dialog box.
2. From the **Select documents to publish** list on the **Find Documents to Publish** dialog box, select the check box beside the documents that you want to publish.



TIP You can quickly select the entire list by clicking **Select All**, or you can clear the entire list by clicking **Clear All**.

3. Click **OK** to accept the selections. The documents you selected to publish now appear in the **Documents to Publish** list on the **Publish** dialog box, and are ready to be published.

NOTE The lists displayed on the **Find Documents to Publish** dialog box are compiled at the time indicated in the **Last search performed** box. You can update the lists by clicking **Update**, but this process can be time-consuming, depending on whether you are running the applications in synchronous or asynchronous mode.

See Also

Publish Documents from SmartPlant Instrumentation (on page 477)

Document Selection Wizard

The Document Selection Wizard allows you to find engineering documents in a specific <unit> of the current domain and add them to the list of selected documents to publish.

Select Document Types (Document Selection Wizard)

Select the check box beside each document type that you want to include for publishing.

Instrument Index data — A document published as a .pdf file (one .pdf file per <unit>). Each instrument index document contains data about all the instruments and loops existing in a SmartPlant Instrumentation database and defined for a specific <unit>.

Instrument process data sheets — Documents containing detailed information about process data values for a specific instrument you have associated with a particular tag number. You can select a tag number and view the corresponding process data sheet for a specific instrument as a read-only .pdf file.

Instrument specification sheets — Documents containing detailed information about specification sheet data associated with a particular tag number. You can select a tag number and view the corresponding specification sheet as a read-only .isf file.

Enhanced SmartLoop reports — Documents containing detailed information about a loop drawing that you generated as an Enhanced SmartLoop report using the Enhanced Report Utility. You can select a loop name and view the corresponding Enhanced SmartLoop report as a read-only .sma file.

Instrument dimensional data sheets — Documents containing detailed information about dimensional data values for a specific instrument that you have associated with a particular tag number. You can select a tag number and view the corresponding dimensional data sheet for a specific instrument as a read-only .pdf file.

NOTE You can publish a new instrument index document each time you make a revision for that document. The source data for the instrument index document is located in the current Instrument Index Standard Browser view.

Select Plant Group (Document Selection Wizard)

Allows you to select the SmartPlant Instrumentation plant group for which you want to publish the selected documents.

Project — Displays 'As-Built' or the name of the SmartPlant Instrumentation project that you selected.

Plant hierarchy — Select a SmartPlant Instrumentation plant group at the lowest plant hierarchy level (for example, a unit).

Select Instrument Process Data Sheets (Document Selection Wizard)

This page allows you to select instrument process data sheets for performing revisions and publishing. You can batch generate process data sheets for instruments in the Instrument Index Standard Browser by using the shortcut menu command **Generate Process Data Sheets**. This is important when you use revisions from SmartPlant Foundation and ensures that the appropriate instruments appear in the **Search results** table when you click **Find**.

You can use wildcards in the fields where you type values: underscore (_) for single characters and percent (%) for multiple characters.

The following table shows search parameters that you can use to narrow the results of your search for process data sheets.

Search Parameter	Explanation	Example
Tag number	Type the whole tag number you are looking for. Include any prefix, suffix, and separator characters. You can use wildcards if needed.	101-FT –2225/1 Or use a wildcard: 101-FT%
Number	Type the numeric segment of a tag number to find all the tag numbers that contain this numeric segment. You can also use wildcards if needed.	2225
Instrument type	Select an instrument type to narrow your search to tags belonging to this instrument type.	D/P Type Flow Element (FE), Mass Flow Transmitter (FT) Pressure (DP)
Status	Select a tag status to narrow your search to tags associated with this status.	An existing device, a new instrument, a relocated device
Location	Select a tag location, such as Field , to narrow your search to tags for which you have defined this location.	Equipment room, junction box
Process function	Select a process function to narrow your search to tags belonging to this process function.	Flow Pressure

Click **Find** to display the process data sheets that exist in the specified <unit> and according to the search parameters, if specified.

In the **Search results** table, you can view the process data documents to select for publishing. Note that the **Revision** column displays the number of the latest revision for each process data sheet.

Select Instrument Specification Sheets (Document Selection Wizard)

This page allows you to select instrument specification sheets for performing revisions and publishing. You can batch generate specification sheets for instruments in the Instrument Index Standard Browser by using the shortcut menu command **Apply Profile > Generate Specification Sheets**. This is important when you use revisions from SmartPlant Foundation and ensures that the appropriate instruments appear in the **Search results** table when you click **Find**.

You can use wildcards in the fields where you type values: underscore (_) for single characters and percent (%) for multiple characters.

The following table shows search parameters that you can use to narrow the results of your search for specification sheets.

Search Parameter	Explanation	Example
Tag number	Type the whole tag number you are looking for. Include any prefix, suffix, and separator characters. You can use wildcards if needed.	101-FT –2225/1 Or use a wildcard: 101-FT%
Number	Type the numeric segment of a tag number to find all the tag numbers that contain this numeric segment. You can also use wildcards if needed.	2225
Instrument type	Select an instrument type to narrow your search to tags belonging to this instrument type.	D/P Type Flow Element (FE), Mass Flow Transmitter (FT) Pressure (DP)
Status	Select a tag status to narrow your search to tags associated with this status.	An existing device, a new instrument, a relocated device
Location	Select a tag location, such as Field , to narrow your search to tags for which you have defined this location.	Equipment room, junction box
Form number	Select a form number to narrow your search to documents that have this specification form number.	

Click **Find** to display the instrument specification sheets that exist in the specified <unit> and according to the search parameters, if specified.

In the **Search results** table, you can view the specification documents to select for publishing. Note that the **Revision** column displays the number of the latest revision for each specification sheet.

Select Enhanced SmartLoop Reports (Document Selection Wizard)

A published loop drawing allows you to view Enhanced SmartLoop reports in .sma format.

You can use wildcards in the fields where you type values: underscore (`_`) for single characters and percent (`%`) for multiple characters.

The following table shows search parameters that you can use to narrow the results of your search for Enhanced SmartLoop reports.

Search Parameter	Explanation	Example
Loop number	Type the whole loop number you are looking for. Include any suffix, and separator characters. Use wildcards if needed.	101F - 2225VA 101F-%
Number	Type the numeric segment of the loop number to find all the loop numbers that contain this numeric segment. Use wildcards if needed.	2225
Measured variable	From the list, select a measured variable to find all the existing loop numbers that have this measured variable.	Density (D) Pressure (DP)

Click **Find** to generate Enhanced SmartLoop reports for the loops that exist in the specified <unit> and according to the search parameters, if specified.

In the **Search results** table, you can view the loops to select for publishing the reports. Note that the **Revision** column displays the number of the latest revision for each loop.

Select Wiring Reports (Document Selection Wizard)

This page allows you to select wiring reports as .pdf files for performing revisions and publishing. You can use wildcards in the fields where you type values: underscore (`_`) for single characters and percent (`%`) for multiple characters.

The following table shows search parameters that you can use to narrow the results of your search for wiring reports.

Search Parameter	Explanation	Example
Panel name	Type the panel name you are looking for. Include any prefix, suffix, and separator characters. Use wildcards if needed.	101 JB -100 JB-%
Type	From the list, select a panel type to narrow your search.	Measuring Device, Monitor, Power Supply

Search Parameter	Explanation	Example
Manufacturer	From the list, select a manufacturer to find all the existing panels that have this manufacturer.	
Model	From the list, select a model to narrow your search to a specific model or group of models for the selected manufacturer.	
Report style	From the list, select the desired report style: With Adjacent Connections or Without Adjacent Connections (Style 2) .	

Click **Find** to generate wiring reports for the panels that exist in the specified <unit> and according to the search parameters, if specified.

In the **Search results** table, you can view the panels to select for publishing the reports. Note that the **Revision** column displays the number of the latest revision for each panel.

Select Dimensional Data Sheets (Document Selection Wizard)

This page allows you to select dimensional data sheets as .pdf files for performing revisions and publishing. You can batch generate dimensional data sheets for instruments in the DDP module by displaying working data and using the shortcut menu command **Regenerate Dimensional Data Sheets**. This is important when you use revisions from SmartPlant Foundation and ensures that the appropriate instruments appear in the **Search results** table when you click **Find**.

You can use wildcards in the fields where you type values: underscore (_) for single characters and percent (%) for multiple characters.

The following table shows search parameters that you can use to narrow the results of your search for dimensional data sheets.

Search Parameter	Explanation	Example
Tag number	Type the whole tag number you are looking for. Include any prefix, suffix, and separator characters. You can use wildcards if needed.	101-FT –2225/1 Or use a wildcard: 101-FT%
Number	Type the numeric segment of a tag number to find all the tag numbers that contain this numeric segment. You can also use wildcards if needed.	2225
Instrument type	Select an instrument type to narrow your search to tags belonging to this instrument type.	D/P Type Flow Element (FE), Mass Flow Transmitter (FT) Pressure (DP)
Dimensional data status	Select a tag status to narrow your search to tags associated with this status.	An existing device, a new instrument, a relocated device

Search Parameter	Explanation	Example
Manufacturer	Select a manufacturer to narrow your search to tags for which you have defined this manufacturer.	Fisher, Honeywell
Dimensional Group	Select a dimensional group to narrow your search to tags belonging to this dimensional group.	IA1, IA2, ICM1, All Groups

NOTE The software supports publishing of dimensional data sheets for certain dimensional groups only. For the full list of supported dimensional groups, see *List of Publishable Dimensional Groups* (see "Publishable Dimensional Groups" on page 474).

Click **Find** to display the dimensional data sheets that exist in the specified <unit> and according to the search parameters, if specified.

In the **Search results** table, you can view the dimensional data documents to select for publishing. Note that the **Revision** column displays the number of the latest revision for each dimensional data sheet.

Document Selection Summary (Document Selection Wizard)

This page allows you to review the number of documents of each type that you have selected. Click **Back** to review or modify your selections. Click **Finish** to accept your selections and return to the **Publish** dialog box.

Revising Documents in an Integrated Environment

The **Revise Documents** command, available on the **SmartPlant** menu, allows you to revise a document and save it to the database of the authoring tool without publishing it. When you register a plant, the software implements integrated revisions. During report publishing, the software first checks whether the report has an integrated revision and then assigns the appropriate revision scheme automatically.

Reserving Revision Number

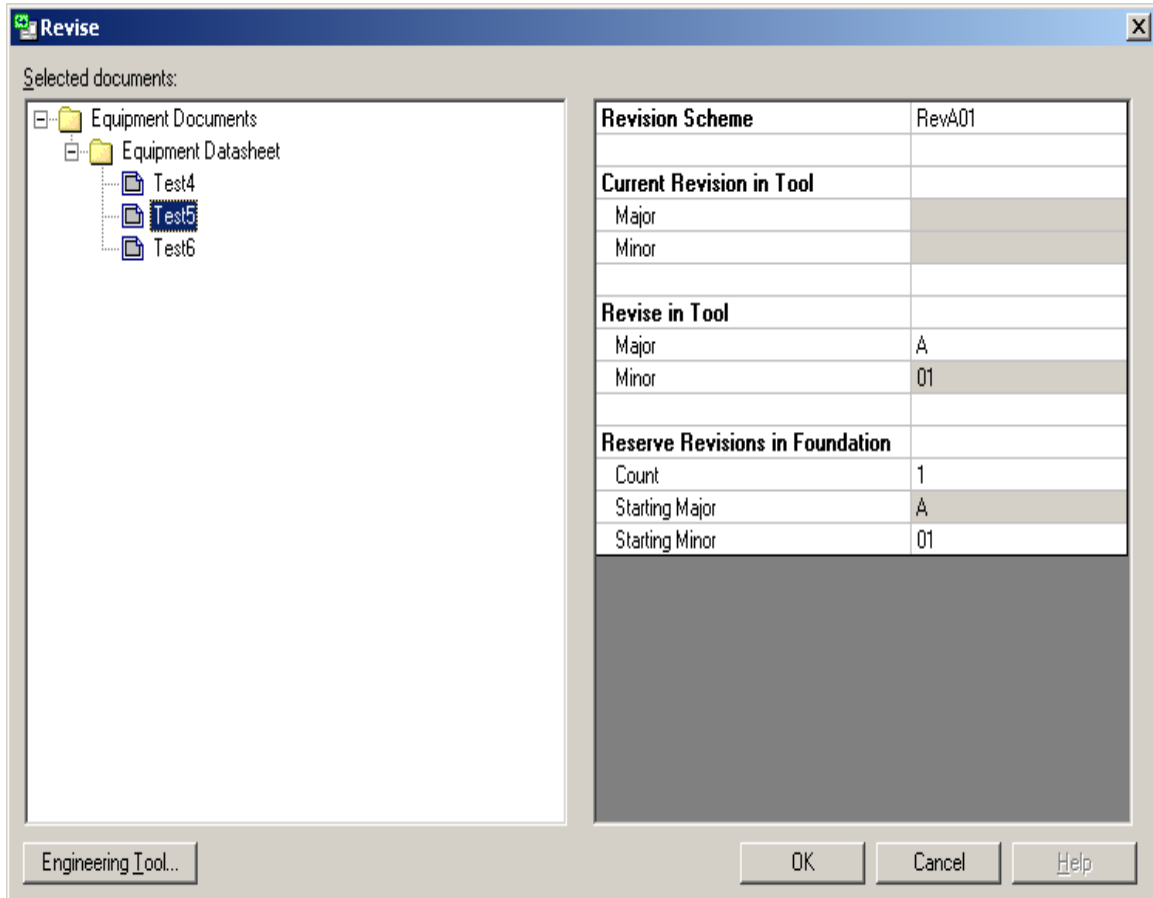
The Revise functionality also provides an option that allows you to designate revisions numbers to the plant or to particular projects. For each document, you can reserve revision numbers at the plant or project level. Using this feature, you can use the same document in different projects, while still allowing the revision numbers to be sequential within each project.

For each project (or even at the plant level) you can reserve a certain number of revisions that are held for that particular project. If the document is used within a different project and revised, it is given either a later revision number or its own set of numbers.

For more information about reserving revision numbers, see the Online Help for the **Revise** dialog box.

Revise a Document

- Do one of the following to open the **Revise** dialog box:
 - From any module that supports publishing and retrieving of documents, on the **Revisions** dialog box, click **New**.
 - From within SmartPlant Instrumentation, click **SmartPlant > Revise Documents**.



NOTES

- This option is available only if you have registered the active SmartPlant Instrumentation plant.
 - If you are logged on to SmartPlant Instrumentation with a user name that is not defined in SmartPlant Foundation for the specific plant, you are prompted to log on to SmartPlant Foundation when you use this command.
 - The documents that appear in the **Selected documents** list on the **Revise** dialog box when it first appears are documents that were selected within the authoring tool before you clicked the **Revise Documents** command.
- For a new document, or a document that does not yet have a defined revision scheme, select the revision scheme you want to use from the **Revision Scheme** list.

NOTE If you selected a document that already has a defined revision scheme, it is displayed in the **Revision Scheme** field and cannot be changed.
 - In the **Revise in Tool** section, choose the next available major and minor revision numbers.

NOTE Any revision numbers that have been reserved by another project are not available and are skipped in the revision scheme, if applicable. In other words, if the current version of the document is B and there are three outstanding revision reservations for that document in other projects, the next available revision number will be F.

4. Click **OK**.

NOTES

- When you click **OK** to revise the document, it is saved to the authoring tool database. The document stored in SmartPlant Foundation is not updated until you publish it from SmartPlant Instrumentation.
- Using the **Revise** dialog box, you can reserve revision numbers, revise documents, or do both at the same time.

Retrieving Documents in an Integrated Environment

When you retrieve documents into an authoring tool, you are retrieving the document data that was published by another authoring tool. For example, in SmartPlant Instrumentation, you can retrieve engineering information from a published P&ID into the SmartPlant Instrumentation database.

The authoring tools provide commands that let you select a document and retrieve it into that tool. You can use either the **SmartPlant > Retrieve** command to open a wizard that assists you in retrieving applicable documents, or with some authoring tools, you can configure an automatic retrieval feature.

NOTE The software trims all leading and trailing spaces from all strings and from all values without units of measure. These spaces do not appear in the retrieved data file.

Additionally, you can access the Web Client through the **SmartPlant > Browser** command. This allows you to select the document or documents that you want to retrieve from your Web Client To Do List, the tree view, or by using the Web Client search functionality. After you select the documents that you want to retrieve, you can use the **Retrieve** command on the Web Client **SmartPlant** menu to start the retrieval process.

The **Retrieve** command provided in the authoring tools is slightly different from the **Retrieve** command available in the SmartPlant Foundation Web Client. The Web Client presents a list of documents from which you can select those you want to retrieve. However, when you use the command from an authoring tool without first selecting documents, the software searches the SmartPlant Foundation project for documents to retrieve, and these are presented in a list on the **Retrieve** dialog box.

You can retrieve a document in two ways:

- **As published** — Retrieves only the data the authoring tool originally published with the selected revision and version of the document. Retrieving as-published data retrieves the .xml file the authoring tool published from the appropriate SmartPlant Foundation vault.
- **With the latest data** — Retrieves the latest data associated with the selected document in the SmartPlant Foundation database. If another, more-recently published document contains updates to objects in the selected document, the software retrieves the most current data in the SmartPlant Foundation database for those shared objects. When you retrieve the latest data, SmartPlant Foundation generates an .xml file containing the published data.

Document Types for Retrieval

From the authoring tools, you can retrieve the plant breakdown structure (PBS) and project documents. The PBS and project documents, created in SmartPlant Foundation, are retrieved by authoring tools to provide information about the plants, areas, units, projects, and contracts that need to be created in the authoring tool so that the information is consistent across all authoring tools.

The PBS document published by SmartPlant Foundation contains information about the physical plant with a structure consisting of plants, areas, and units. The default structure is plant/area/unit, but you can define a custom hierarchy in the Schema Editor. The project breakdown structure, project list, and project definition document contain information about the project or projects and their statuses in a plant/project structure.

NOTES

- Retrieving the project breakdown documents and the PBS into SmartPlant Engineering Manager creates the appropriate structures automatically.
- When using SmartPlant Instrumentation, you must create the plant hierarchy according to the PBS information in SmartPlant Foundation before you retrieve either the PBS or the project definition document. You must create a plant hierarchy with at least three levels with a minimum of one PBS item at the lowest level before you can retrieve the PBS and project definition document.

In SmartPlant Instrumentation, the following documents are retrievable out of the box. Your administrator can configure other documents for retrieve.

- Electrical Signal I/O Lists
- Electrical Power Element Reports
- Instrument Process Data Sheets
- Schematics
- P&IDs (includes instruments, loops, lines, equipment, and control system functions)

NOTE After you retrieve a P&ID, you can change the unit of measure (UOM) if all conditions (minimum, maximum, and normal) are the same in the retrieved document. If you change the UOM and the conditions are not the same, the software will warn you.

Data Handling After Retrieval

The authoring tool that you use also determines how the system deals with changes in downstream data when you retrieve a document. SmartPlant P&ID, SmartPlant Instrumentation, SmartPlant Electrical, and Aspen Basic Engineering analyze the impact of the newly retrieved data on the existing database, then place tasks on the authoring tools **To Do List** that allow you to create, delete, or modify items at the appropriate time in the design process. The **To Do List** gives you the opportunity to view and understand potential changes before accepting, deleting, or modifying those changes.

Design Basis

Objects that tools retrieve from other authoring tool documents can become the design basis for objects in downstream documents. Objects that become the design basis for other objects can be specific objects that get richer as they move through the lifecycle or they can be schematic or logical objects in one application that evolve into more detailed objects downstream.

Design basis is implicit based on retrieval; you do not have to define it. For example, a pump retrieved from a PFD becomes the design basis for a pump in the P&ID. When you change common properties for the pump and retrieve the changes into SmartPlant P&ID, tasks to update the pump automatically appear in the To Do List. The same process works for logical items that are a design basis for other items, such as a P&ID tag in SmartPlant P&ID can evolve into a control loop with associated tag numbers in SmartPlant Instrumentation.

See Also

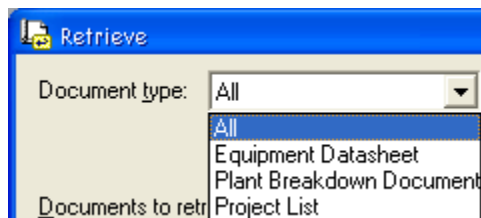
Using the To Do List (on page 502)

Retrieve Documents to SmartPlant Instrumentation

1. Display one of the following:
 - The main **SmartPlant Instrumentation** window with no modules open.
 - The Instrument Index Standard Browser view.
2. Click **SmartPlant > Retrieve**.

NOTES

- If you logged onto SmartPlant Instrumentation with a user name that is not defined in the integrated environment, you are prompted to log on when you use this command.
 - The **Retrieve** command searches the integrated environment for documents that are ready to be retrieved into SmartPlant Instrumentation. These documents appear in the **Documents to retrieve** list on the **Retrieve** dialog box.
3. On the **Retrieve** dialog box, in the **Document type** box, specify the type of document to be retrieved.



- In the **Show** section, select **Documents to be retrieved only** to include documents that have been retrieved previously and have been published again since the last retrieval. Select **All documents** to include all revisions and types of documents. Select **New documents only** to retrieve documents that have not been retrieved yet.

Document type: All

Show

☒ Documents to be retrieved only

☐ New documents only

☐ All documents

Documents to retrieve:

Name	Type	Revisi	Versio	Status	Last Retrieved	Retrieve Option
☒ Test1	Equipme	2	1	Approved I	[1,1] 5/22/200E	As published

Select All Clear All

☐ Batch retrieve

OK Cancel Help

- In the **Documents to retrieve** list, select the check box beside each document you want to retrieve. To help identify the documents, review the details in the **Type**, **Revision**, **Version**, and **Last Retrieved** columns.

TIP To quickly select the entire list, click **Select All**. To quickly cancel the selections, click **Clear All**.

- For each document you checked, use the **Retrieve Option** column to specify whether you want to retrieve the document with the latest data or retrieve it as published.
- Click **OK** to retrieve the specified documents.

NOTES

- Check the **Batch retrieve** option if you want the retrieve process to run in batch mode. If you select this option, an e-mail message will alert you when the process is complete. Otherwise, the retrieval process begins when you click **OK**.
- The Deleted and Unclaimed Objects document is retrieved automatically every time you retrieve, if there is a newer version of this document since the last retrieval. The document is not included in the list, but it is retrieved automatically, when necessary, to ensure that the applicable information is updated.
- When the retrieve is complete, a dialog box appears indicating whether the retrieve operation was completed successfully or with errors. If the **View Log** button on the dialog box is enabled, you can click it to view messages concerning the operation. These may be errors, warnings or informational messages.

Retrieving Control Valves with Pipe Runs

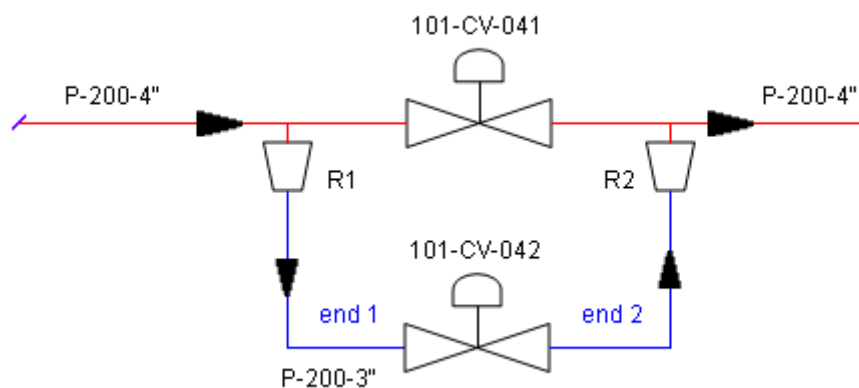
Only pipe runs that have a related instrument are retrieved from SmartPlant P&ID as lines. The instrument receives its preliminary process data from the related line. For control valves, the line that is retrieved in most scenarios corresponds to the pipe run directly connected to the upstream end of the valve, except under certain conditions.

These conditions are:

1. The flow direction is specified.
2. A reducer is connected at the **upstream** end of the valve.
3. The **larger** diameter pipe is connected to the **far end** of the reducer.

If **all** of the above conditions are fulfilled, the retrieved pipe run is **not** the one directly connected to the upstream end of the valve, but rather the pipe run at the far end of the reducer.

The following diagram shows an example of a P&ID involving pipe runs and related control valves.



For this scenario:

- The flow direction is specified for both valves.
- Reducer R2 is connected downstream of both valves and therefore has no influence on the pipe run retrieval.
- In relation to valve 101-CV-041, reducer R1 is connected with the **smaller** diameter pipe at the far end of the reducer, so pipe run P-200-4" is retrieved with valve 101-CV-041.
- In relation to valve 101-CV-042, reducer R1 is connected with the **larger** diameter pipe at the far end of the reducer, so pipe run P-200-4" is retrieved with valve 101-CV-041.

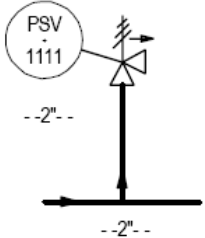
Therefore SmartPlant Instrumentation retrieves both valves with pipe run P-200-4". Pipe run P-200-3" is not retrieved.

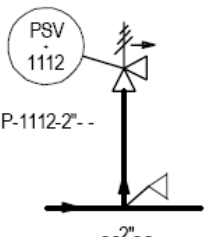
Retrieving Relief Valves with Pipe Runs

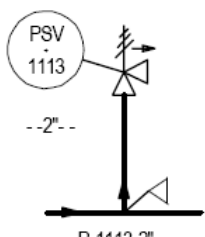
When SmartPlant Instrumentation retrieves data from SmartPlant P&ID, it traverses piping connectivity from instruments to detect relationships to process lines and process equipment. SmartPlant Instrumentation has been enhanced to include special cases for relief valves. The following examples describe use cases in which the retrieval creates the process line or process equipment that contains the relief valve, and the relationship between these objects.

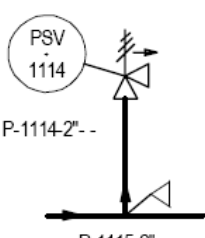
Connected Directly to Main Line

- 1**

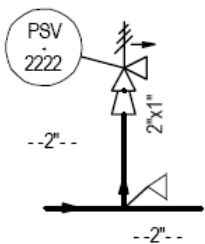
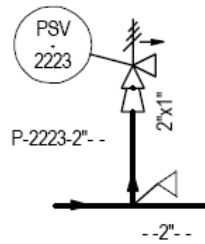
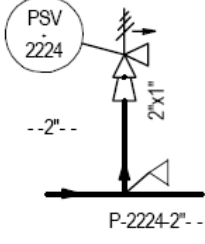
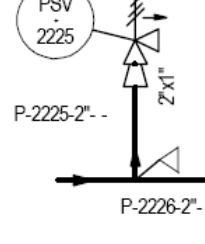

 - No relationship is created between the relief valve and pipe run because the pipe run immediately connected to the relief valve is unnamed.
- 2**


 - A relationship is created between the relief valve and pipe run because the immediately connected pipe run is named.
- 3**

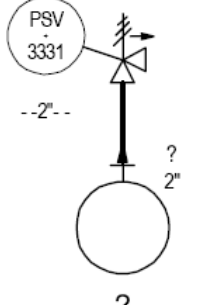

 - A relationship to P-1113-2" because the piperun immediately connected to the relief valve is unnamed.
- 4**

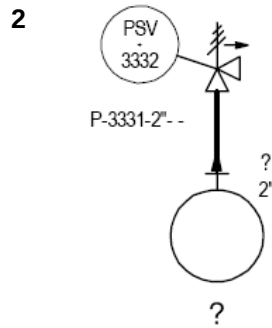

 - A relationship is created between the relief valve and piperun P-1114-2" because it is named and the immediately connected pipe run.

Connected to Main Line through Reducer

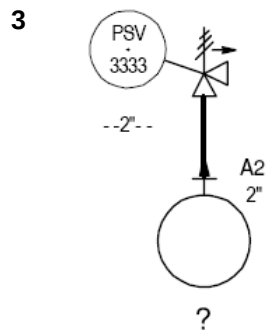
- 1
 
 - No relationship is created between the relief valve and pipe run because the pipe run that is immediately connected through the reducer is unnamed.
- 2
 
 - A relationship is created between the relief valve and pipe run because the pipe run that is immediately connected through the reducer is named.
- 3
 
 - A relationship is created to named pipe run P-2224-2" because the pipe run immediately connected through the reducer is unnamed.
- 4
 
 - A relationship is created between the relief valve and pipe run P-2225-2" because it is named and the immediately connected reducer.

Connected Directly to Nozzle

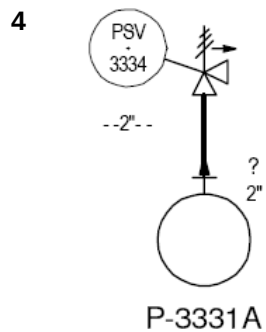
- 1
 
 - No relationship is created because the immediately connected pipe run and equipment are unnamed.



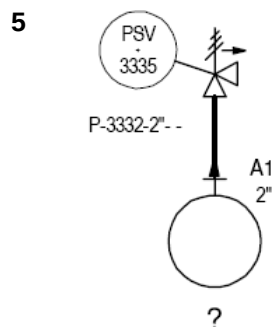
- A relationship is created between the relief valve and the immediately connected pipe run P-3331-2".
- In this scenario, a named pipe run takes priority if the equipment is unnamed.



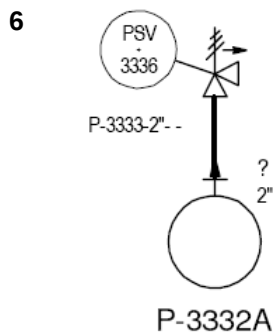
- No relationship is created because the immediately connected pipe run and equipment are unnamed.



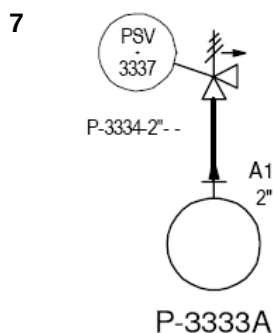
- A relationship is created between the relief valve and equipment because the immediately connected equipment P-3331A is named.



- A relationship is created between the relief valve and the named pipe run P-3332-2".

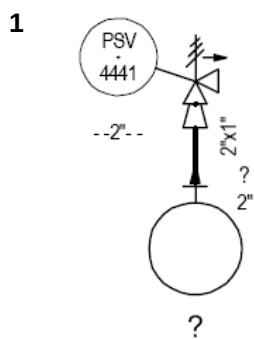


- A relationship is created between the relief valve and the immediately connected pipe run P-3332-2".

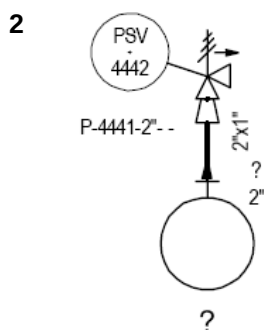


- A relationship is created between the relief valve and the immediately connected pipe run P-3334-2".

Connect to Nozzle through a Reducer

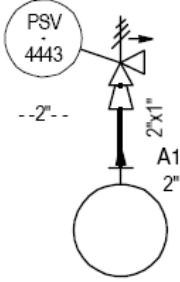


- No relationship is created because the immediately connected pipe run and equipment are unnamed.



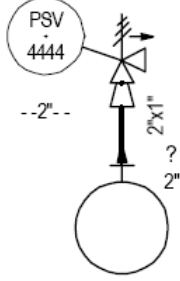
- A relationship is created between the relief valve and the immediately connected pipe run P-4441-2".

- 3**



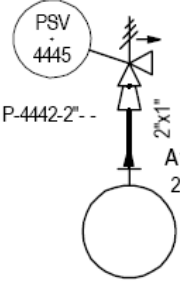
?

 - No relationship is created because the immediately connected pipe run and equipment are unnamed.
- 4**



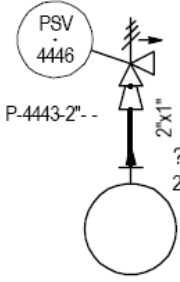
P-4441

 - A relationship is created between the relief valve and equipment because the immediately connected equipment P-4441 is named.
- 5**



?

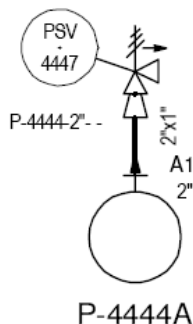
 - A relationship is created between the relief valve and the named pipe run P-4442-2\".
- 6**



P-4442A

 - A relationship is created between the relief valve and the immediately connected pipe run P-4443-2\".

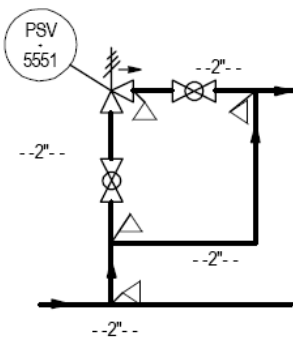
7



- A relationship is created between the relief valve and the immediately connected pipe run P-4444-2".

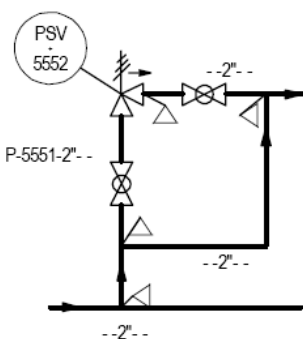
Branching Connection without Reducers

1



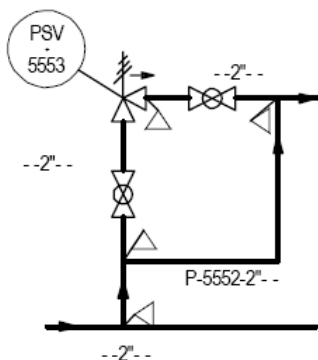
- No relationship is created between the relief valve and the immediately connected downstream pipe run because the pipe run is unnamed.

2

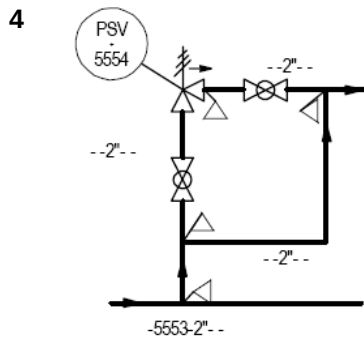


- A relationship is created between the relief valve and immediately connected downstream pipe run P-5551-2" because the pipe run is named.

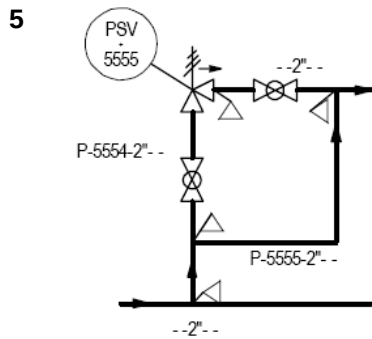
3



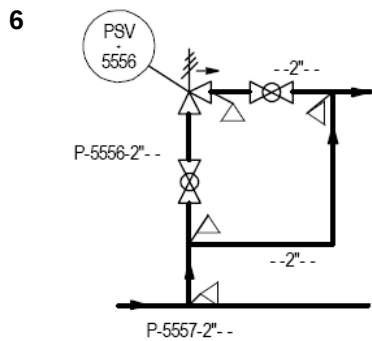
- No relationship is created between the relief valve and the immediately connected downstream pipe run because the pipe run is unnamed.
- No relationship is created with the named pipe run P-5552-2" because the relationship cannot jump a branch point.



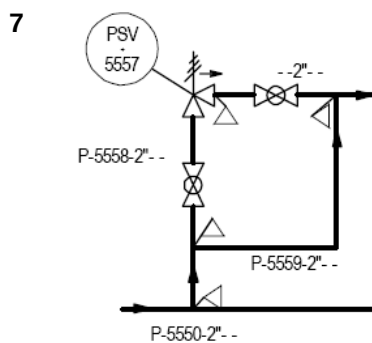
- A relationship is created between the relief valve and the named pipe run P-5553-2" because the immediately connected piperun is unnamed.



- A relationship is created between the relief valve and immediately connected downstream pipe run P-5554-2" because the pipe run is named.
- No relationship is created with the named pipe run P-5555-2" because the relationship cannot jump a branch point.



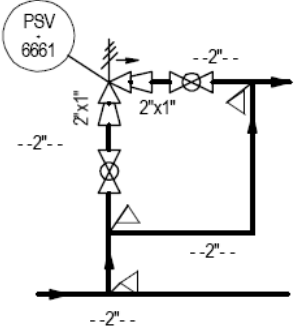
- A relationship is created between the relief valve and immediately connected downstream pipe run P-5556-2" because the pipe run is named.

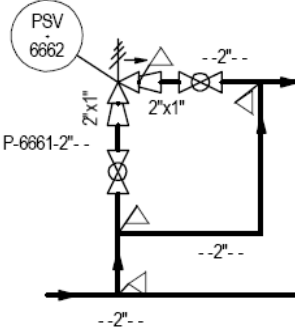


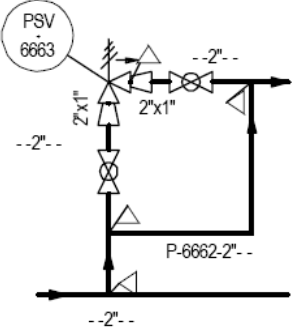
- A relationship is created between the relief valve and immediately connected downstream pipe run P-5558-2" because the pipe run is named.

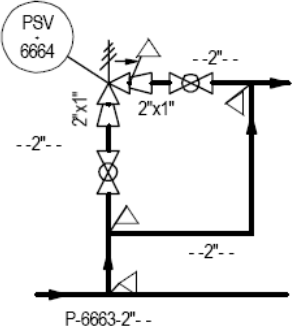
Branching Connection with Reducers

- 1**

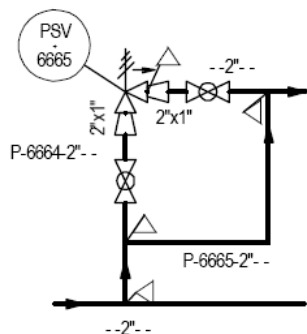

 - No relationship is created between the relief valve and immediately connected downstream pipe run because the pipe run connect through the reducer is unnamed.
- 2**


 - A relationship is created between the relief valve and immediately connected downstream pipe run P-6661-2" because the pipe run connected through the reducer is named.
- 3**


 - No relationship is created between the relief valve and the immediately connected downstream pipe run because the pipe run connected through the reducer is unnamed.
 - No relationship is created with the named pipe run P-6662-2" because the relationship cannot jump a branch point.
- 4**

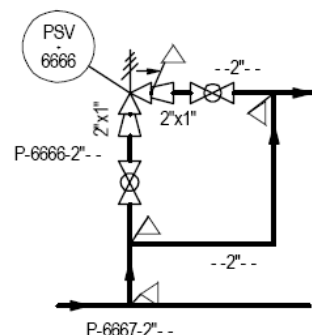

 - A relationship is created between the relief valve and the named pipe run P-6663-2" because the immediately connected downstream pipe run connected through the reducer is unnamed.

5



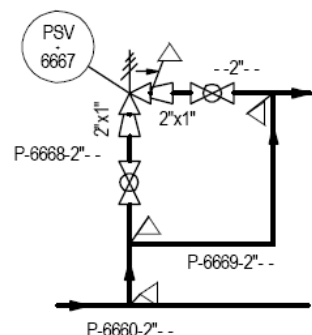
- A relationship is created between the relief valve and the immediately connected downstream pipe run P-6664-2" because the pipe run connected through the reducer is named.
- No relationship is created with the named pipe run P-6665-2" because the relationship cannot jump a branch point.

6



- A relationship is created between the relief valve and the immediately connected downstream pipe run P-6666-2" because the pipe run connected through the reducer is named.

7



- A relationship is created between the relief valve and the immediately connected downstream pipe run P-6667-2" because the pipe run connected through the reducer is named.

Using the To Do List

The To Do List allows you to keep track of tasks required to keep your plant updated with information in an integrated environment. Specifically, this feature aids in retrieving data by providing a list of all the things that must be added, deleted, or modified to bring the plant data into agreement with the latest retrieved information.

All the users of a plant database share a single To Do List. You can view the entire To Do List and see the tasks that have been completed and those that are pending. Some types of tasks have associated code and when you run those tasks, the software modifies the database.

From the To Do List, you can run, defer, or delete tasks, or specify tasks that you want the software to ignore in future retrievals. Additionally, you can view properties for each task in the To Do List and, if desired, specify that certain task properties are ignored when the task is retrieved. The information that is available is specific to the type of task that is selected: **Create** tasks and **Update** tasks, for instance, but certain information is provided for all types. The available task types are:

- **Create** — Creates a new item in the plant
- **Update** — Updates the selected properties of the specified item
- **Delete** — Deletes the specified item from the plant
- **Manual** — Creates and displays a reminder. You can decide when a manual task is complete and set the status accordingly.

Each task in the To Do List has a status. Initially, the status is **Open**. If you successfully run the task, the status changes to **Completed** . If you attempt to run a task, but the process is not completed successfully, the status is changed to **Error** . **Error** status occurs, for example, if you attempt to run an **Update** task assigned to a drawing that is not currently open. You can also postpone running a task and change its status to **Deferred** .

NOTES

- When an **Update** task is created in the To Do List, the units of measure used in properties are automatically converted to the defaults for the plant. The software converts units of measure used for properties in **Create** tasks to the plant defaults when the task is run.
- By clicking the To Do List column headings, you sort the list by the values in that column. You can change the order in which these columns appear by selecting a column heading and dragging it to the left or right to the desired position.

See Also

Update the To Do List Display (on page 508)

Remove Tasks from the To Do List (on page 506)

Defer Tasks from the To Do List (on page 506)

Run Tasks from the To Do List (on page 504)

Set Preferences for the To Do List

1. Log on to SmartPlant Instrumentation.
2. Click **File > Preferences**.
3. In the **Preferences** dialog box tree-view pane, click **SmartPlant Integration > To Do List**.
4. Under **Task execution**, click the desired option to determine how the software executes tasks in the To Do List when you implement the **Run** command:
 - **Execute** — Executes tasks immediately.
 - **Submit** — Submits tasks for batch execution at a later stage.
5. Select other options as desired.

Modify To Do List Task Properties

1. Click **SmartPlant > To Do List**.
2. In the **To Do List** window, select the task that you want to edit.
3. On the To Do List toolbar, click **Properties** .

TIP You can also open the **Task Properties** dialog box by double-clicking a task in the To Do List.
4. On the **Task Properties** dialog box, click the **Details** tab.

NOTE The properties available for each task depend on the type of task. For all types, you can edit the name and notes for the task. For Create tasks, you can ignore task properties when running a task. You can also edit the item being created and turn off or on the values assigned to different properties for that item. For Update tasks, you can turn off or on the new values assigned to properties for the item.

Run Tasks from the To Do List

You run tasks to create, update, or delete data in the SmartPlant Instrumentation database with data from a retrieved document.

1. Click **SmartPlant > To Do List**.
2. In the **To Do List** window, select one or more tasks that you want to run.

NOTES

- You can configure the **Run** command to execute tasks immediately or to submit selected tasks for batch execution at a later stage. For details, see *Set Preferences for the To Do List* (on page 503).
 - Before running tasks, you can select a filter to run only tasks that meet certain criteria, for example Update tasks only. For details, see *Filter To Do List Tasks* (on page 505).
 - You can select specific data columns for which to transfer data values from the **Details** tab on the **Task Properties** dialog box.
 - You can select all the tasks in the To Do List by pressing **Ctrl + A**.
3. On the To Do List toolbar, click **Run** .

NOTES

- When creating process data for which minimum, normal, and maximum values of a property apply, the software converts the minimum and maximum values to the normal units of measure, if different. If there is no normal value, the software converts to the maximum units of measure, and if there are no normal and maximum values, only the minimum value is used. For updates, the software converts all values to the existing units of measure in SmartPlant Instrumentation.
- When retrieving loops without equipment and tag numbers with equipment and then running a task that creates a relation between the loops and the tag numbers, you must ensure that the loop equipment is not set to propagate to the tag numbers by default, otherwise, the empty loop equipment value will overwrite the existing equipment values for the tag numbers. To do so, before running the task, open the intools.ini file, and under the [Index] section, type the following line:

```
LoopNoPropagateCheck=1
```

Task Dependencies

When you run tasks, there are some task types that require other tasks to run first. For example, if two tasks exist for an item, one to move it to another <unit>, and the other to update some of the item properties, the software cannot run the update task until the Move task is complete. The software analyzes the To Do List for these dependencies to ensure that the tasks run in the appropriate sequence. The following table indicates the dependencies that can exist between different task types.

Master Task	Dependent Task
Claim	Move
Claim	Update
Move	Update

Task dependencies influence the way in which the result of running a master task affects the status of the dependent tasks. On running a task, the software checks the To Do List for prerequisites, and changes the status of relevant tasks from **New** to **Submitted**. If the status of a prerequisite task is **Deferred**, **Deleted**, or **Failed**, then the software marks all dependent tasks as **Failed**.

Another example of task dependencies is where you have related tasks for items in a hierarchical relationship; for example Panel - Rack - Slot - I/O card -Terminal. You can select a particular task, such as a Create task for an I/O card, and use the **Select Parent Tasks**  or **Select Sub-Tasks**  commands to highlight the desired set of related tasks.

Complete a Task from the To Do List

1. Click **SmartPlant > To Do List**.
2. In the **To Do List** window, select one or more tasks to complete.
TIP You can select all the tasks in the To Do List by pressing **Ctrl + A**.
3. On the To Do List toolbar, click **Complete** .

Sort To Do List Tasks

This procedure enables you to sort the To Do List tasks by task properties such as **Status**, **Task Type**, **Item Type**, and **Item Name**.

1. Click **SmartPlant > To Do List**.
2. On the To Do List toolbar, click **Sort Tasks** .
3. On the **Sort** dialog box, select a property under the **Available columns** list.
4. Do one of the following:
 - Click **Add**.
 - Drag the selected property to the **Sort by** pane.
5. Repeat for other properties that you want to sort by.
TIP After selecting the columns, you can change the sort order for the properties by selecting a column in the **Sort by** pane and clicking **Move Up** or **Move Down** as needed.
6. If you want to specify sorting for a particular column by descending order of the values, select the **Descending** check box beside that column. Clear the check box to sort by that column in ascending order.

Filter To Do List Tasks

This procedure enables you to filter the To Do List tasks by task properties or for tasks with specific values. For example, you may want to filter only those tags with task type **Create**.

1. Click **SmartPlant > To Do List**.
2. On the To Do List toolbar, click **Filter Tasks** .
3. On the **Filter** dialog box, click **Add** to specify a new filter condition.
4. Specify the filter condition by selecting the desired parameters from the **Property**, **Operator**, and **Value** columns; for example, you can specify the condition:
Task Type = Create
5. If desired, specify additional filter conditions.
6. For two or more conditions, specify the logic (AND or OR) between each pair of successive conditions.

Defer Tasks from the To Do List

1. Click **SmartPlant > To Do List**.
2. In the **To Do List** window, select one or more tasks that you want to defer.
TIP You can select all the tasks in the To Do List by pressing **Ctrl + A**.
3. On the To Do List toolbar, click **Defer** .
TIP If you choose to defer a task that has related sub-tasks, we recommend that you first run the **Select Sub-Tasks** command  and invoke the **Defer** command on all the selected tasks. Otherwise, if you try to run tasks where only the parent task is deferred, the software generates errors.

Remove Tasks from the To Do List

This procedure enables you to delete tasks that are no longer needed from the To Do List. Permanent deletion of tasks is a two-stage operation. First, you need to move the task from the To Do List to a buffer that displays tasks intended for deletion. If necessary, you can restore tasks in the buffer to the To Do List. Next, you delete the task from the buffer. When you delete the task from the buffer, the software removes it from the database and it cannot be restored.

1. Click **SmartPlant > To Do List**.
2. In the **To Do List** window, select one or more tasks that you want to remove.
TIP You can select all the tasks in the To Do List by pressing **Ctrl + A**.
3. On the To Do List toolbar, click **Delete** .
TIP If you choose to remove a task that has related sub-tasks, we recommend that you first run the **Select Sub-Tasks** command  and invoke the **Delete** command on all the selected tasks. Otherwise, if you try to run tasks where only the parent task is deleted, the software generates errors.

Display Deleted To Do List Tasks

1. Click **SmartPlant > To Do List**.
2. On the To Do List toolbar, click **View Deleted Tasks** .
TIP To return to the To Do List, click this command again.
3. To delete tasks permanently, select the tasks that you want to delete, and on the toolbar, click **Delete** .

Ignore To Do List Tasks

This procedure enables you to set as ignored those tasks that you do not want to run each time you retrieve data. Ignored tasks are moved to a separate buffer. In contrast to deferred or deleted tasks, the software continues not to run ignored tasks even after subsequent retrieval.

1. Click **SmartPlant > To Do List**.
2. In the **To Do List** window, select the **Create** tasks that you want to be ignored.
3. On the To Do List toolbar, click **Ignore** .

TIP If you choose to ignore a task that has related sub-tasks, we recommend that you first run the **Select Sub-Tasks** command  and invoke the **Ignore** command on all the selected tasks. Otherwise, if you try to run tasks where only the parent task is ignored, the software generates errors.

Ignore Task Properties

1. Click **SmartPlant > To Do List**.
2. In the **To Do List** window, select a **Create** task for which you want to ignore properties.
3. On the To Do List toolbar, click **Properties** .
4. On the **Task Properties** dialog box, click the **Details** tab.
5. Select the **Ignore** check box beside each property that you want the software to ignore when you run the task.

NOTES

- When you select to ignore a property, the software does not update that property when you run the task for the current or for subsequent retrieve sessions. If the new value of the property changes in the published data, on the next retrieve, that property is no longer ignored. If you want to ignore the property only for the current retrieve session, clear both the **Activate** and **Ignore** check boxes beside the property.
- After running a task that includes ignored properties, that task is copied from the To Do List to the ignored tasks list, where only the properties that were selected to be ignored appear on the **Details** tab.

Display Ignored To Do List Tasks

1. Click **SmartPlant > To Do List**.
2. On the To Do List toolbar, click **View Ignored Tasks** .
3. To delete ignored tasks permanently, select the tasks that you want to delete, and on the toolbar, click **Delete** . This action makes the task available from the To Do List the next time you retrieve the document to which the task belongs.

Run a To Do List Report

1. Click **SmartPlant > To Do List**.
2. On the To Do List toolbar, click **Report** .

Update the To Do List Display

Updating the To Do List display is useful when several users can access the To Do List, and you want to refresh the display with the latest information from the SmartPlant Instrumentation database after another user has modified the item specified by the task.

- On the To Do list toolbar, click **Refresh** .

SQL Server uses data files which are resized automatically as the data grows, until the disk is full. When this happens, you can add another data file on a different disk. The following tasks are used frequently when you need to perform database maintenance tasks on SQL Server.

Add a Filegroup

Filegroups are used as containers for datafiles. A filegroup can be connected to one database only. Usually, two filegroups are used for each domain: one for data tables and the other for table indexes. You can backup and restore data for a filegroup. A primary filegroup contains stored procedures and triggers. When deleting a domain, the entire filegroup and the datafiles it contains are deleted, resulting in cleaner data, without causing damage to the database. For more information, see Add a Filegroup.

Print Filegroup Information

This procedure explains how the System Administrator can display the list of all the existing SQL Server filegroups and print out the filegroup information. For more information, see Print Filegroup Information.

Add a Log File

The database log file is used internally by SQL Server to backtrack aborted user sessions. This way you can resume any previous sessions that you stopped or canceled. This procedure explains how to add a log file. For more information, see Add a Log File.

Add a Datafile to the TEMPDB Database

This procedure enables you to add a datafile to the SQL Server TEMPDB Database. This database is used internally by the SQL Server to make all the required temporary operations. Such operations are needed when SmartPlant Instrumentation brings data in a certain order, and the database needs to sort this set of data after retrieving it. For more information, see Add a Datafile to the TEMPDB Database.

Optimize Indexes

This procedure enables you to optimize fragmented SQL Server indexes. The SQL Server indexes become fragmented during the domain lifetime and contribute to database under-performance. In this case you can rearrange your SQL Server indexes to optimize them. As you keep storing and deleting domain data, the SQL Extents become disordered thus slowing down SQL command execution. SmartPlant Instrumentation solves this problem by reordering the indexes stored in these Extents. For more information, see Optimize Indexes.

1. With the **System Administration** window open, click **DBA > Add Datafiles**.
2. Click the **Filegroup** tab.
3. In the **System Admin. Password** field, type the password to log on as the Database System Administrator (this field is empty by default).
4. In the **New file information** section, type the datafile name, the datafile location, and the initial size (in MB).
5. Click **Add** to add the filegroup.
1. Start the Administration module and log on as System Administrator.
2. With the **System Administration** window open, click **DBA > Filegroup List**.
3. In the **Filegroup List** dialog box, review the existing filegroup information.
4. Click **Print** to print out the information displayed in the data window of the **Filegroup List** dialog box.
5. Click **Close**.

CAUTION You should exercise caution when adding a log file, as doing so affects the entire SQL Server.

1. With the **System Administration** window open, click **DBA > Add Datafiles**.
2. Click the **Log** tab.
3. In the **System Admin. Password** field, type the password to log on as the Database System Administrator (this field is empty by default).
4. In the **New file information** section, type the datafile name, the datafile location, and the initial size (in MB).
5. Click **Add** to add the filegroup.

IMPORTANT On SQL Server, TEMPDB is automatically incremented and depends on a disk size. If TEMPDB reaches the disk limit, you can increase the TEMPDB database size by adding a datafile to another disk.

1. With the **System Administration** window open, click **DBA > Add Datafiles**.
2. Click the **Tempdb** tab.
3. In the **New file information** section, type the datafile name, the datafile location, and the initial size (in MB).
4. Click **Add** to add the datafile to the TEMPDB database.

IMPORTANT Before starting the optimization process, make sure that no other user is using the currently selected domain. If you attempt to optimize the indexes of a domain which is currently being used by another user, the software displays a message warning you that the domain is currently in use.

1. With the **System Administration** window open, click **DBA > Optimize Indexes**.
2. From the **Domain** list, select the required domain.
3. Do one of the following to define the tables you want to include in the optimization process:
 - Click **All tables** to optimize the indexes of all the existing tables in the defined domain.
 - Click **Selected tables** to display the database indexes in the **Table Name** data window and optimize the indexes of the highlighted tables in the defined domain.
4. Do one of the following to define the index source on which you base the optimization:
 - Click **Current database** to optimize indexes using the current database indexes.
 - Click **Template database** to optimize indexes using the IN_TEMPL.DB template database indexes. Use the **Template database** option if your current database indexes have been deleted or become unusable.

5. Click **OK**.

NOTE To enable better performance after completing the index optimization process, you need to update statistics. Start the Query Analyzer and run the SP_UPDATESTATS procedure.

The following tasks are used frequently when you need to perform database maintenance tasks on Oracle.

View Tablespace Data

Tablespaces are database domains where Oracle keeps your SmartPlant Instrumentation database information. The tablespace data is physically stored in one or more files. This option allows you to view a list of tablespaces in which there is still free space to store data. For more information, see View Tablespace Data.

Add Datafiles to Tablespaces

If your system reports that you ran out of space in the database tablespaces or if the system fails to perform, you can use this option to increase the database tablespace by attaching additional datafiles to an existing tablespace. For more information, see Add Datafiles to Oracle Tablespaces.

Optimize Indexes

You can use this option to optimize fragmented Oracle database indexes. Oracle database indexes become fragmented during the domain lifetime and contribute to database under-performance. In this case, you can rearrange your database indexes to optimize them. The domain index data is generated during the initialization phase. The index data is grouped into one or more Extents which may account for the index fragmentation level. As you keep storing and deleting domain data, the Oracle Extents become disordered thus slowing down SQL command execution. SmartPlant Instrumentation solves this problem by reordering the indexes stored in these Extents. For more information, see Optimize Indexes.

Update Statistics

This option enables you to improve the Oracle SQL command processing performance, especially after a large data import or after optimizing indexes, or after initializing a domain on Oracle. During updating the statistics, SmartPlant Instrumentation executes an ANALYZE SQL command which retrieves the statistical data for the SmartPlant Instrumentation tables. That statistical information is later used by the Oracle Cost-based Optimizer to optimize SQL command execution. For more information, see Update Statistics.

- With the System Administration window open, click **DBA > Tablespaces List** to display the data for all filegroups that have free space for storing data.

TIP To learn about Oracle tablespaces used in SmartPlant Instrumentation, see Oracle Database Server Tablespaces for SmartPlant Instrumentation.

IMPORTANT This procedure enables you to add a datafile to a tablespace. Therefore, make sure you have enough free disk space on the drive where the tablespace is stored.

1. With the **System Administration** window open, click **DBA > Add Datafiles**.
2. From the **Tablespace** list, select the tablespace you want to resize.

3. In the **Datafile name** box, type the full path and name of a new additional datafile that you want to attach to the currently selected tablespace.

TIPS

- Ensure that you select a datafile which is not currently in use.
- The datafile format must be .db.

4. In the **Datafile size** box, type the size of the additional datafile.
5. Click **OK** and make sure the software displays a message notifying you that the selected tablespace was increased successfully.

IMPORTANT

- Before optimizing indexes in SmartPlant Instrumentation tables, make sure that in the Oracle Instance Configuration file, the OPTIMIZER_MODE parameter value is either CHOOSE (default) or COST. This way, you activate the Oracle Cost-based Optimizer, which determines the quality of the SmartPlant Instrumentation database performance.
 - Before starting the optimization process, make sure that no other user is using the currently selected domain. If you attempt to optimize the indexes of a domain which is currently being used by another user, the software displays a message warning you that the domain is currently in use.
1. With the **System Administration** window open, click **DBA > Tuning > Optimize Indexes**.
 2. From the **Domain** list, select the domain in which you want to optimize indexes.

TIPS

- The **Fragmentation** column displays the number of Extents of each index.
 - It is recommended to optimize all database indexes whose fragmentation level is higher than 4.
3. Do one of the following:
 - Click **All tables** to optimize the indexes for all the tables in the selected domain.
 - Click **Selected tables** to display in the data window all the tables in the current domain and optimize the indexes for the required tables.
 4. Click **OK** to start the optimization process.

NOTE To enable better performance after completing the index optimization process, you need to update statistics. Without updating statistics, the Oracle Cost-based Optimizer cannot use the reordered indexes.

- With the **System Administration** window open, click **DBA > Tuning > Update Statistics**.

NOTE This option is available to both System and Domain Administrator when using SmartPlant Instrumentation on Oracle.

The following tasks are used frequently when you need to perform general database maintenance tasks.

Define Databases for Logging On to SmartPlant Instrumentation

Use this procedure to enable SmartPlant Instrumentation users to select a database when logging on to SmartPlant Instrumentation. After performing this procedure, users can select a database from the **Database** list on the **Logon Information** dialog box and connect to this database. All the databases that you want to make available for connection must belong to the same database platform: Oracle, SQL Server, or Sybase Adaptive Server Anywhere. For more information, see Define Databases for Logging On to SmartPlant Instrumentation.

Switch Between Databases

Use this procedure to switch from one database to another using the Intools.ini file. In this procedure, the following Sybase Adaptive Server Anywhere databases are used as an example:

- **Intools.db** — Empty database used as a seed for building databases
- **In_demo.db** — Demonstration database used for practice and as a reference

For more information, see Switch Between Databases.

Rebuild Default Views in Domains

Use this procedure to rebuild the default views of all the database objects for a specific domain. You must rebuild the default views after upgrading SmartPlant Instrumentation to Version 2009. This is because during the upgrade, the software makes changes to certain tables, and as a result, the default views associated with these tables might become invalid. For more information, see Rebuild Default Views in Domains.

Rebuild Stored Procedures and Triggers

This procedure is used by the System Administrator for the following purposes:

- To identify abnormal database behavior and solve it by rebuilding the stored procedures and triggers in the database if the software displays inappropriate SQL messages when using SmartPlant Instrumentation.
- To enable users who have a full version of Sybase Adaptive Server Anywhere engine (dbeng10.exe) to work in a domain backed up to Sybase Adaptive Server Anywhere (Intools_Backup.db or its copy).

You can rebuild stored procedures either for the Admin schema or for a specific Domain schema. For more information, see Rebuild Stored Procedures and Triggers.

Rebuild Catalog Tables

Use this procedure to rebuild the catalog tables, which enable users to work with multi-tag specifications in the Specifications module. The software creates the catalog tables during the SmartPlant Instrumentation database setup. If the software encounters a database problem when creating the catalog tables, you can try to rebuild them to resolve the problem. If such a problem occurs, the software displays a message notifying you that you cannot work with multi-tag specifications due to a problem with the catalog tables. For more information, see Rebuild Catalog Tables.

Prerequisites for SQL Server

- You must define a separate ODBC profile for each database you want to make available for selection on the **Logon Information** dialog box of SmartPlant Instrumentation. This is required because SQL Server uses an ODBC profile to connect to the SmartPlant Instrumentation database. When you install SmartPlant Instrumentation on a client machine, in the client Windows registry, the software creates an empty profile. For SQL Server 2005, the default ODBC profile is **MSS2005**. After running the DB Setup Utility, the software automatically fills in the profile setting in the client Windows Registry and adds a database connection string in the [Database] section of the Intools.ini file. If you run the DB Setup Utility again to create another SmartPlant Instrumentation database in SQL Server, the software overwrites the previous connection settings in the Intools.ini file. Therefore, you cannot use the same ODBC profile for connection to different databases. You create a new ODBC profile using the Windows **Data Sources (ODBC)** option and define a unique DSN value, for example, **MSS2005_1**.

- Make sure that in the [Database] section of the Intools.ini file, the **MSS** value of the **DBMS** parameter appears in upper case. Otherwise, it is not possible to work with specifications in SmartPlant Instrumentation.

Prerequisite for Sybase Adaptive Server Anywhere

- You must define an ODBC profile for each database you want to make available for selection on the **Logon Information** dialog box of SmartPlant Instrumentation. You can create ODBC profiles using the Internal Setup Utility or Windows **Data Sources (ODBC)** option.

Define Databases

- In the Intools.ini file, create a [Profiles] section and define the list of databases you want to display on the **Logon Information** dialog box in the **Database** list:

```
[Profiles]
Database1=My_Database1
Database2=My_Database2
Database3=My_Database3
Default=My_Database1
```

TIPS

- The **Database<number>** parameter does not have to be the actual name of the database (or profile names if the database type is SQL Server or Sybase Adaptive Server Anywhere). This value is a display name that appears in the **Database** list on the **Logon Information** dialog box.
 - The **Default** parameter value is the database that appears selected by default in the **Database** list on the **Logon Information** dialog box.
- For each database that appears in the [Profiles] section, create a separate section with the appropriate profile name and define the connection parameters.

IMPORTANT Do not delete the original [Database] section.

The following table shows one example for each database type.

Example for Oracle	Example for SQL Server 2005	Example for Sybase Adaptive Server Anywhere
<pre>[My_Database1] DBMS=O10 LogId=IN_DBAMN LogPassword=IN_DBAMN ServerName=Oracle Database=ORC1 UserId= DatabasePassword= TableDir=0 StayConnected=1 AutoCommit=0 DBParm='DisableBind=1' Prompt=110 Commit=100</pre>	<pre>[My_Database2] DBMS=MSS LogId=SPI_DBAMN LogPassword=SPI_DBA ServerName= Database= UserId= DatabasePassword= TableDir=0 StayConnected=1 AutoCommit=0 DBParm="ConnectionString='DSN= MSS2005;UID=SPI_DBAMN;PW D= SPI_DBA',DisableBind=1" DSN=MSS2005 Prompt=110 Commit=100</pre>	<pre>[My_Database3] DBMS=ODBC LogId=IN_DBAMN LogPassword=IN_DBAMN ServerName= Database= UserId= DatabasePassword= TableDir=0 StayConnected=1 AutoCommit=0 DBParm=ConnectionString='DSN= IN_DEMO;UID=IN_DBAMN;PWD= IN_DBAMN' Prompt=110 Commit=100</pre>

TIPS

- When the database type is SQL Server, the **DisableBind=1** is not the only value of the **DbParm** parameter. Make sure that it is not enclosed by single quotes and is separated from other values by a comma, as shown in the example in the table.
 - The **LogId** parameter value corresponds to the default Admin schema logon name. When your database resides in SQL Server, the default Admin schema logon name is **SPI_DBAMN**. This setting must be different from the Admin schema logon password, which is the value of the **LogPassword** parameter.
3. Save and close the Intools.ini file.
 4. Test the software by opening **Logon Information** dialog box and checking the **Database** list values.

TIP The databases that appear in the **Logon Information** dialog box are specific to the platform to which you have connected; databases belonging to other platforms do not appear.

NOTE The database users select on the **Logon Information** dialog box becomes the default database.

Working with Administration Module

Domain Administration

System Administration

In the [Database] section of your Intools.ini file, the following lines appear for logging on to the databases:

- For the demo database:
dbparm=connectstring='dsn=in_demo;uid=in_dbamn;pwd=in_dbamn'
 - For the empty database:
dbparm=connectstring='dsn=intools;uid=in_dbamn;pwd=in_dbamn'
1. If the line representing the database that you want to access begins with a semicolon (;), remove it.
 2. Insert a semicolon at the beginning of the line representing the database that you do **not** want to access.

IMPORTANT

- You can only rebuild the default views supplied with the SmartPlant Instrumentation database. You cannot rebuild any user-defined views.
- Make sure that all users have logged out of the database before starting this procedure.

1. With the **System Administration** window open, click **DBA > Rebuild Default Views in Domains**.
2. From the **Domain** list, select the domain whose database views you want to rebuild.
3. In the **View-Only Domain schema password** box, enter the logon password of the View-Only Domain schema. The password characters appear masked.

TIP You can change the password only once, when initializing a new domain. If you did not change the password when initializing the selected domain, enter the default logon password, which is <Domain schema logon name>_VIEW.

4. If working on SQL Server, type the SQL Server System Administrator's password.
5. Click **OK** to start rebuilding the views of the selected domain.

CAUTIONS

- This procedure should only be carried out when you are specifically instructed to do so by Intergraph Support.
- Make sure that all users have logged out of the SmartPlant Instrumentation database before starting this procedure. When you start rebuilding stored procedures and triggers, no users should attempt to log on to SmartPlant Instrumentation.

Create a Batch Rebuild File

As in batch upgrade, you can create a .bat file that rebuilds stored procedures and triggers for multiple domains simultaneously. The following procedure describes how to create a batch rebuild file.

1. In **Notepad**, create a batch file (for example, **BatchRebuild.bat**).
2. Enter a line for each domain you are asked to rebuild stored procedures and triggers for, as shown in the example below:


```
Upgrade -9999 //rebuild stored procedures and triggers
for admin schema
Upgrade -<proj_id> //rebuild stored procedures and triggers
for a specific domain
```
3. Double-click the batch file to run it and rebuild stored procedures and triggers for the defined domains.

TIP You can schedule the batch file to run at a convenient time using Windows scheduler (for example, during the night or over the weekend).

Rebuild Stores Procedures and Triggers Manually

1. With the **System Administration** window open, click **DBA >Rebuild Stored Procedures and Triggers**.
2. Do one of the following:
 - Click **Admin schema** to rebuild stored procedures and triggers of the Admin schema.
 - Click **Domain schema** and then, under **Domain**, select a domain for which you can rebuild stored procedures and triggers.
3. Click **OK**.

TIPS

- When rebuilding stored procedures and triggers of the Admin schema, the **Domain** list is redundant.
 - If the process stops for any reason, you can restart the process and the process continues from where it stopped. If you get an error that cannot be corrected, contact Intergraph Support with the error description. It is recommended that you have your log file available when contacting Intergraph Support.
4. On the **Rebuild Stored Procedures** dialog box you can click **Browse** to specify the log file path and filename, if you do not want to use the default **Log.txt** file. This file contains information of the current session and any errors that may have occurred in previous sessions. The log file is concatenated, if you use the same log file name.
 5. Click **OK** to start rebuilding the stored procedures and triggers of the selected schema.

At the end of the process, an appropriate message is displayed and an additional log file **Logerror.txt** is generated in the SmartPlant Instrumentation home folder. The data in the **Logerror.txt** file is incremented between sessions. Send the **Logerror.txt** file to Intergraph Support after you complete the process.

IMPORTANT Make sure that all users have logged out of the SmartPlant Instrumentation database before starting this procedure.

1. With the **System Administration** window open, click **DBA >Rebuild Catalog Tables**.
2. Click **OK** to start rebuilding all the catalog tables.

SmartPlant Instrumentation Explorer

You use the **SmartPlant Instrumentation Explorer** to access and manage all the items that exist in SmartPlant Instrumentation. SmartPlant Instrumentation features the **Domain Explorer** and the **Reference Explorer**.

- **Domain Explorer** — this view of the **SmartPlant Instrumentation Explorer** allows you to create and manage your current domain items. You can perform almost all the actions that are possible in the SmartPlant Instrumentation modules. For example, you can create new tag numbers, edit their properties, create and edit wiring items, make wiring connections, generate various data sheets, reports, and so forth. Also, you can copy items from the **Reference Explorer** and this way create items based on reference configurations on the fly. The **Domain Explorer** displays instrumentation items according to hierarchical structure. You can arrange the hierarchical structure of the data according to the item types, the physical location of the items, or the item sequence within their parent item. For more information, see *Working with the Domain Explorer* (on page 519).
- **Reference Explorer** — allows you to create and manage all the available wiring reference items that are created by SmartPlant Instrumentation users and that are provided with the software. Note that wiring reference items are typical configurations that facilitate rapid creation of various wiring items in your domain. For more information, see *Working with the Reference Explorer*.

NOTE When you create an item in the domain explorer, make sure you set the naming convention for it in the Administration module. For details, see *Naming Conventions: An Overview* in the *Administration User's Guide*, under *Domain Administration*.

SECTION 36

Working with the Domain Explorer

You use the **Domain Explorer** to create and manage your current domain items. The **Domain Explorer** displays instrumentation items according to hierarchical structure. You can arrange the hierarchical structure of the data according to the item types, the physical location of the items, or the item sequence within their parent item.

NOTE When you create an item in the domain explorer, make sure you set the naming convention for it in the Administration module. For details, see *Naming Conventions: An Overview* in the *Administration User's Guide*, under *Domain and Project Administration*.

The **Domain Explorer** enables you to perform almost all the actions that are possible in the SmartPlant Instrumentation modules. For example, you can create new tag numbers, edit their properties, create and edit wiring items, open the **Connection** window to make wiring connections, generate various data sheets, reports, and so forth. You can drag items from the **Reference Explorer** to the **Domain Explorer** and in this way create numerous items based on reference configurations on the fly. Also, you can drag items from the **Domain Explorer** to the **Reference Explorer** to create reference items based on existing configurations.

Working with the **Domain Explorer** is another mode of working with SmartPlant Instrumentation, just like working with SmartPlant Instrumentation modules.

You can open the **Domain Explorer** from anywhere in SmartPlant Instrumentation. Press F7 or on the **Tools** menu, click **Domain Explorer**.

TIPS

- Depending on the access rights that have been granted to you, the **Domain Explorer** allows you to perform actions with SmartPlant Instrumentation items that belong to all the existing <plants> in your domain and not just with the items in the plant that you have currently logged in.
- You can expand the hierarchy of any <unit> and view the item structure. However, specification, process data, or calculation sheets are only accessible from the <unit> you have logged on to. Process data, specification, and calculation sheets of items belonging to <units> that you are not logged to are not accessible even for viewing.

The tree view pane of the **Domain Explorer** shows instrumentation items organized by folders. SmartPlant Instrumentation defines standard folders in the database. You cannot move or delete these folders, nor can you add new folders. Each folder contains a particular item type, and the options available on the menus depend on the currently selected item type.

For a detailed explanation of all the folders and their organization in the **Domain Explorer**, see *The Organization of Items in the Domain Explorer Tree View* (on page 525).

Item status indicators — the software uses various icons beside a folder or item to indicate the status of a folder or an item, for example **access denied**, **view only**, **an item that belongs to As-Built**, and so forth. For the full list of the item indicators, see *Item Status Indicators in the Domain Explorer* (on page 540).

NOTES

- You can open several instances of the **Domain Explorer** by pressing F7.
- After exiting SmartPlant Instrumentation, and starting a new session, the software retains the size and position of all the windows that were open in the previous session.

Some SmartPlant Instrumentation modules have their own **Explorers**. These are just limited views of the **Domain Explorer** and they contain items specific to their modules. For details, see *SmartPlant Instrumentation Explorer* (on page 517).

Domain Explorer Window

You use the **Domain Explorer** to create and manage your current domain items. The **Domain Explorer** displays instrumentation items according to hierarchical structure. You can arrange the hierarchical structure of the data according to the item types, the physical location of the items, or the item sequence within their parent item.

The **Domain Explorer** enables you to perform almost all the actions that are possible in the SmartPlant Instrumentation modules. For example, you can create new tag numbers, edit their properties, create and edit wiring items, open the **Connection** window make wiring connections, generate various data sheets, reports, and so forth. Also, you can copy items from the **Reference Explorer** and this way create items based on reference configurations on the fly.

Working with the **Domain Explorer** is another mode of working with SmartPlant Instrumentation, just like working with SmartPlant Instrumentation modules.

You can open the **Domain Explorer** from anywhere in SmartPlant Instrumentation. Press F7 or click **Tools > Domain Explorer**.

NOTES

- Depending on the access rights that have been granted to you, the **Domain Explorer** allows you to perform actions with SmartPlant Instrumentation items that belong to all the existing plants in your domain and not just with the items in the plant that you have currently logged in.
- You can expand the hierarchy of any <unit> and view the item structure. However, specification, process data, or calculation sheets are only accessible from the <unit> you have logged on to. Process data, specification, and calculation sheets of items belonging to <units> that you are not logged to are not accessible even for viewing.

The main features of the **Domain Explorer** are as follows.

(List of Views) — Allows you to select the standard **Domain Explorer** view or a custom view that you have defined. To add items to a custom view, right-click a folder in the tree view pane or multiple folders in the **Items** pane and then on the shortcut menu click **Add to Custom View** and then click an appropriate custom view command.

New Custom View  — Opens the **Custom View Properties** dialog box where you can define custom views.

Toolbar

Search  — Opens the **Search** dialog box where you can look for items that you want to work with.

Refresh  — Updates the **Domain Explorer** display. This feature is useful where multiple users are working on the same set of data.

Filter  — Allows you to filter the items in the **Domain Explorer** display. You can use this toolbar command if you do one of the following:

- Do not select anything in the **Explorer** tree view — this allows you to filter the entire tree view according to a specific item name.
- Select the root node in the **Explorer** tree view — this allows you to filter the entire tree view according to a specific item name.
- Select a tree view node whose immediate child items are folders and not plant items — this allows you to filter the entire tree view according to a specific item type that you select from the **Item type** list on the **Filter Definition** dialog box.
- Select any tree view node or folder that contains child item to filter that node or folder according to a specific item type.

View  — Toggles through each view of the items in the **Items** pane. You can click the arrow and select the desired view.

Find  — Opens the **Find Item** dialog box where you can look for a specific item in the tree view.

Print  — Prints the browser view that you selected for the current hierarchy node. This button becomes available only after selecting the **Show Browser** command.

Tree View Pane

The tree view pane of the **Domain Explorer** shows instrumentation items organized by folders. SmartPlant Instrumentation defines standard folders in the database. You cannot move or delete these folders, nor can you add new folders. Each folder contains a particular item type, and the options available on the menus depend on the selected item type.

Expand or collapse the hierarchy by clicking the  and  icons respectively or by double-clicking a folder. Expand a folder to display the items. If you cannot expand a folder, that folder is empty. To perform an action, right-click a folder or an item and then click a command. Also, to move an item to another parent item, drag that item to another folder or a parent item as you require.

After you double-click the top level of your plant hierarchy, the tree view shows the **Domain Explorer** folders and the next level of the plant hierarchy. The following is a brief description of the item arrangement in the folders:

- Loops and instrument tags are arranged at the lowest level of the plant hierarchy. You can navigate to a loop or an instrument tag by expanding the plant hierarchy. Continue expanding your plant hierarchy to display the **Loops** and **Instruments** folders. The **Instruments** folder contains all the existing instrument tags in the current <unit>. Instrument tags can be parent items of CS tags, specification sheets, process data sheets, and any other documents that are associated with the selected tag number. Also, there are several other folders that contain view-only information.
- Panels are arranged by their locations and categories. Therefore, you can access a panel and its child items by expanding the **Panels by Location** or **Panels by Category** folder. Panels, in turn, contain other wiring items such as racks, wiring equipment, terminal strips, and so forth.
- Cables and their child items are arranged in a separate folder. There is also a separate folder for cross cables.
- Process equipment and lines are arranged in separate folders. Right-clicking the **Process Equipment** folder allows you to create a new process equipment item. Right-clicking the **Lines** folder allows you to create a new line.
- Hook-ups are arranged in a folder at top level of the tree view. You can expand the **Hook-Ups** folder to access all the existing hook-ups and their child items. Right-clicking the **Hook-Ups** folder allows you to create a new hook-up types and hook-ups.
- CAD drawing are arranged in the **Drawing Block Types** folder at top level of the tree view. You can expand the **Drawing Block Types** folder to access all the existing block types and blocks. In this folder, you create your current <plant> blocks but you do not make any associations. you can associate blocks with loops or instruments only in the **Loops** folder or using the Loop Drawings module options.
- There are several other folders at the top level of the tree view. These folders hold P&IDs, Telecom panels, Foundation Fieldbus segments, controllers, and test equipment. Note that some of these folders only display the existing items and do not allow you to create new ones.

For a detailed explanation of all the folders in the **Domain Explorer**, see *The Organization of Items in the Domain Explorer Tree View* (on page 525).

Item status indicators — the software uses various icons beside a folder or item to indicate the status of a folder or an item, for example **access denied**, **view only**, **an item that belongs to As-Built**, and so forth. For the full list of the item indicators, see *Item Status Indicators in the Domain Explorer* (on page 540).

Items Pane

The **Items** pane (list view) pane of the **Domain Explorer** displays the individual items that comprise the hierarchy of the item or the folder that you selected in the tree view. You can choose one of the following three ways to display the items in this pane:

- **List** — Displays the individual items that comprise the hierarchy of the item or the folder that you selected in the tree view.
- **My List** — Allows you to create a special view of the **Items** pane where you can keep items that belong to various folders in the tree view. The software retains all the items in the **My List** view until you remove them from that list. The list count displays the number of items displayed in the **List** pane.
- **Show Browser** — Allows you to display a browser view in the **Items** pane for an item type or a folder that you select in the **Domain Explorer** tree view. This way, instead of displaying child items, you can display item properties of the item you selected in the tree view pane. The software allows you to print out the current browser view, however, you cannot edit the item properties.
- **List count** — Displays the number of individual items that comprise the hierarchy of the item or the folder that you selected in the tree view.

NOTES

- You can open several instances of the **Domain Explorer** by pressing F7.
- After exiting SmartPlant Instrumentation, and starting a new session, the software retains the size and position of all the windows that were open in the previous session.
- Some SmartPlant Instrumentation modules have their own **Explorers**. These are just limited views of the **Domain Explorer** and they contain items specific to their modules. For details, see *SmartPlant Instrumentation Explorer* (on page 517).

Domain Explorer Common Tasks

The following tasks are used frequently when you work with the **Domain Explorer**.

Create an Item in the Domain Explorer

This procedure shows how to create an item in the **Domain Explorer**. For more information, see *Create an Item in the Domain Explorer* (on page 540).

Edit Item Properties

This procedure explains how to edit the properties of an item that you select in the **Domain Explorer**. For more information, see *Edit Item Properties* (on page 541).

Duplicate an Item

You use this action to create a duplicate item within the same parent hierarchy. That is, the software creates another copy of the selected item under the immediate parent item. For example, if you need to insert an apparatus within an existing apparatus group, expand an apparatus group and duplicate an apparatus. You can then change the sequence numbers of the apparatuses to re-arrange them on the strip the way you require. Furthermore, if you are duplicating a panel or another item that contains child items, the software duplicates this item in its entirety. That is, SmartPlant Instrumentation creates the new item with exactly the same child items as the original panel. Note that in this case, the software also retains all the existing internal connections if you selected **Copy internal connections** in the wiring preferences. For more information, see *Duplicate an Item* (on page 541).

Move an Item in the Domain Explorer

This feature allows you move an item from one parent item to another within the **Domain Explorer**. This can be very helpful when, for example, you want to move a terminal strip to another panel. If you are moving an item that contains child items, the software moves the selected item together with all its child item.

Note that the same rules apply when you want to move an item in the **Reference Explorer**. If you drag an item from the **Reference Explorer** to the **Domain Explorer** or vice versa, SmartPlant Instrumentation creates a copy of that item and retains the selected one in its original place. If you open another instance of the **Domain Explorer** and drag an item from one **Domain Explorer** window to another, the same rules apply as when you drag an item within the same **Domain Explorer** window.

For more information, see *Move an Item in the Domain Explorer* (on page 541).

Delete Items

This procedure shows how to delete the items that you select in the **Domain Explorer**. For more information, see *Delete Items* (on page 541).

Search for Items in SmartPlant Instrumentation Explorer

You use this feature to find items that you want to work with. You can search for multiple items in the entire domain, the current highest plant hierarchy level, or the current lowest plant hierarchy level. The term "current" refers to the plant hierarchy level that you selected in the **Open** dialog box when you started SmartPlant Instrumentation. For more information about searching for items, see *Search for Items in SmartPlant Instrumentation Explorer* (on page 542).

Find an Item in the Tree View of an Explorer Window

This feature enables you to find an item in the **Domain Explorer** tree view. This feature is especially useful when you want to find an item in a particular folder that contains numerous items. You can type an item name and click **Find** or you can let the software look for the item as you type the item name. The feature allows you to set the search delay that determines how long the software waits after the last time you press a key on your keyboard.

For more information, see *Find an Item in the Tree View of an Explorer Window* (on page 543).

Filter the Display of Items According to a Specific Item Type

This option allows you to filter the items according to a specific item type. You can apply an item type filter to the entire tree view of the current view of the current **Explorer** window or only to a particular folder or node that contains child items. Item type filters override your item name filters.

Also, you can filter the items so that the software displays only those items that belong to the current lowest plant hierarchy level and only those items that were created by the current user of SmartPlant Instrumentation. You can use these two filtering options on their own or in concurrence with another filter definition.

Filter settings take effect only for the user who defined the filter and only for the current custom view of the active **Explorer** window.

Note that item type filters override your item name filters.

For more information, see *Filter the Display of Items According to a Specific Item Type* (on page 544).

Filter the Display of Items According to a Specific Item Name

This option allows you to filter the items according to a specific item name. An item name filter affects the entire tree view of the current view of the active **Explorer** window and not just a particular folder or hierarchy node. You can also instruct the software to override the item type filters if needed.

Also, you can filter the items so that the software displays only those items that belong to the current lowest plant hierarchy level and only those items that were created by the current user of SmartPlant Instrumentation. You can use these two filtering options on their own or in concurrence with another filter definition.

You can define an item name filter only if you do one of the following:

- Without selecting anything in the **Explorer** window, click  on the toolbar.
- Right-click the root node in the **Explorer** tree view and then on the shortcut menu, click **Filter**.

Note that filter settings take effect only for the user who defined the filter and only for the current custom view of the active **Explorer** window. For more information, see *Filter the Display of Items According to a Specific Item Name* (on page 544).

Filter Cables in an Explorer Window

Allows you to set additional filter definitions for the **Cables** and the **Cross Cables** folders. You can filter cables according to their connections and cables that are connected to a specific Foundation Fieldbus or Profibus segment. For more information, see *Filter Cables in an Explorer Window* (on page 545).

Filter Loops in an Explorer Window

Allows you to set additional filter definitions for the **Loops** folder. You can filter loops according to blocks associated with loop tags. For more information, see *Filter Loops in an Explorer Window* (on page 546).

Add Items to My List in the Items Pane

This procedure explains how to add various items to the **My List** view of the **Items** pane. **My List** allows you to create a special view of the **Items** pane where you can keep items that belong to various folders in the tree view. The software retains all the items in the **My List** view until you remove them from that list. Exiting SmartPlant Instrumentation and starting a new session does not affect the contents of **My List**. For more information, see *Add Items to My List in the Items Pane* (on page 548).

Display a Browser View in the Explorer Items Pane

This option allows you to display a browser view in the **Items** pane for an item type or a folder that you select in the **Domain Explorer** tree view. This way, instead of displaying child items, you can display item properties of the item you selected in the tree view pane. The software displays the browser view according to the style settings of the selected browser. You can print out the current browser view, however, you cannot edit the item properties. For more information, see *Display a Browser View in the Explorer Items Pane* (on page 547).

Perform Various Actions with an Instrument

This feature allows you to select a tag number and perform various actions. You can effect I/O assignment, associate blocks, create CS tags, create device panels and cables, connect device panels, and so forth. For more information, see *Perform Various Actions with an Instrument* (on page 542).

Generate a Specification or a Process Data Sheet for an Instrument

This option allows you to select a tag number and generate a specification and a process data sheet. For more information, see *Generate a Specification or a Process Data Sheet for an Instrument* (on page 542).

Define and Use a Custom View

SmartPlant Instrumentation allows you to define custom views for the **Domain Explorer** and the **Reference Explorer**. The software lets you select a folder or multiple folders and add these folders with their child items to a custom view that you select. Note that the custom views that you define are not available to other users of SmartPlant Instrumentation. For more information, see *Define and Use a Custom View* (on page 548).

For the rules that govern the dragging of items in the **Domain Explorer**, see *Association Rules in the Domain Explorer* (on page 536).

The Organization of Items in the Domain Explorer Tree View

The tree view pane of the **Domain Explorer** shows instrumentation items organized by folders. SmartPlant Instrumentation defines standard folders in the database. You cannot move or delete these folders, nor can you add new folders. Each folder contains a particular item type, and the options available on the menus depend on the currently selected item type.

After expanding a plant hierarchy, the following folders are displayed:

Loops

Loops are arranged at the lowest level of the plant hierarchy. You can navigate to a loop by expanding the plant hierarchy. Continue expanding your plant hierarchy to display the **Loops** folder that contains all the existing loops in the current <unit>. Loops, in turn, can contain loop blocks used in CAD loop drawing generation, instruments and control system tags. Instruments can contain instrument blocks used in CAD loop drawing generation. For more information, see *Items in the Loops Folder* (on page 535).

Instruments

Instrument tags are arranged at the lowest level of the plant hierarchy in the **Instruments** folder. You can navigate to a tag number by expanding the plant hierarchy. Continue expanding your plant hierarchy to display the **Instruments** folder that contains all the existing tag numbers in the current <unit>. Instrument tags can be parent items of CS tags, maintenance event record, specifications, process data sheets, and any other documents that are associated with a selected instrument tag.

Electrical Tags

This folder holds all the tag numbers that have either been published to SmartPlant Instrumentation from SmartPlant Electrical or that you have created for the purpose of representing electrical signals. You can associate these tags with items under the Electrical Equipment folder and publish the items with these associations back to SmartPlant Electrical.

Uncoupled CS Tags

This folder holds all the CS tags that are not linked to another tag (uncoupled CS tags). You can view the list of existing tags and open the tag number properties for editing. You can also create new tags by right-clicking this folder.

Functional Requirement Tags

This folder holds all the existing functional requirement tag numbers. You can only view the list of existing tags and open the tag number properties for editing. You cannot create new tags by right-clicking this folder.

Wiring items are organized in the following folders:

Panels by Location

Panels are arranged according to their location and category. In this folder, panels are arranged according to their location. You can perform the following actions:

- Create a new location based on the structure you define in the **Location Manager**.
- Move a panel from one location to another by dragging it to another location.
- Right-click a location and create a new panel and then create the required child items.
- When right-clicking a location or a wiring item within a location, you can perform various actions that are available on the shortcut menu.

You can create various wiring structures in the **Panels by Location** folder. For an example of one possible wiring structure, see *Panels by Location Hierarchy Example* (on page 531).

Panels by Category

In this folder, panels are arranged according to their category. Panels, in turn, contain their child items, for example terminal strips, racks, wiring equipment, and so forth. There is a lot of flexibility in creating a panel hierarchy. There is no rigid structure like "panel - strip - terminal" that limits your wiring design. You can create various wiring structures, as you require. See *Panels by Category Hierarchy Examples* (on page 529) to examine a few possible structures.

Cables

This folder holds all the existing cables. You can create various child items under cables. For an example, see *Cable Hierarchy Example* (on page 531).

Cross Cables

This folder holds all the cross wiring cables and wires. You can create new cross cables and cross wires as you require.

Lines, hook-ups, process equipment, P&IDs, and so forth are organized in separate folders at the top hierarchy level of the tree view.:

Telecom Equipment

This folder holds all the available telecom equipment cabinets classified by their categories: **PA Cabinets**, **PABX Cabinets**, **Miscellaneous**, **Hubs**, **Amplifiers**, and **Intercoms**. Each folder displays the existing equipment cabinets belonging to that category. You cannot create new cabinets in the **Telecom Equipment** folder. To create a new equipment cabinet, expand the following hierarchy: **Panels by Category > Telecom Panels > Equipment Cabinets**. Then, right-click the **Equipment Cabinets** folder, point to **New** and click the command that you require.

Process Equipment

This folder displays all the existing equipment that your instruments are installed on. Equipment is also categorized according to different types, such as compressors, burners, pumps, and so on. You can right-click this folder and create new process equipment. Then, you can create an instrument by right-clicking an equipment item.

Lines

This folder holds all the existing lines in your <plant>. After right-clicking a line, you can add a new instrument.

Fieldbus Segments

This folder contains all the segments, their associated tag numbers and virtual tags that exist in your fieldbus system. All fieldbus items are arranged in a tree-like hierarchy that can be expanded and collapsed. For details, see *Fieldbus Segments in the Domain Explorer* (on page 531).

Hook-Ups

This folder holds all the existing hook-up types, hook-ups, and their child items. For details, see *Items in the Hook-Ups Folder* (on page 533).

P&IDs

This folder displays all the existing P&ID document references. You can right-click a P&ID document reference and create a new instrument, loop, and line.

Controllers

This folder displays all the existing controllers and their child items. You cannot create new controllers in this folder, but you can select a slot and add a terminal strip, an I/O card, or any other wiring equipment item.

Drawing Block Types

This folder holds all the existing CAD drawing block types and their blocks, which you use when generating CAD loop drawings. In this folder, you create your blocks but you do not make any associations. You can only associate blocks with loops or instruments using the **Loops** folder actions of the Loop Drawings module options. For details, see *Items in the Drawing Block Types Folder* (on page 532).

Electrical Equipment

This folder holds all the items of electrical equipment that have been retrieved from SmartPlant Electrical. In this folder, you can view the items and associate them with electrical signals. For details, see *Items in the Electrical Equipment Folder* (on page 533).

Test Equipment

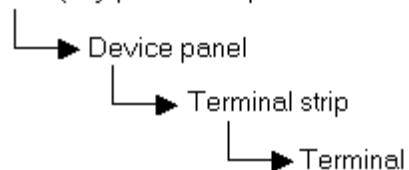
This folder displays all the items of test equipment that have been created in SmartPlant Instrumentation.

Panels by Category Hierarchy Examples

The following examples show a number of different structures that you can create in the **Panels by Category** folder.

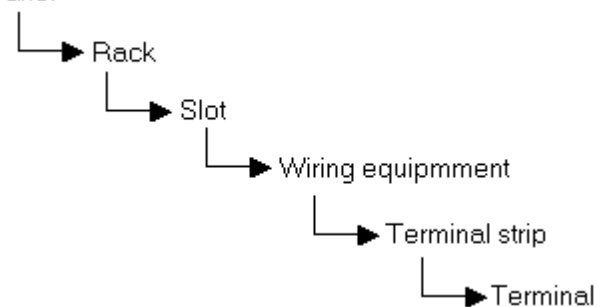
Example 1:

Panel (any panel except for a device panel)



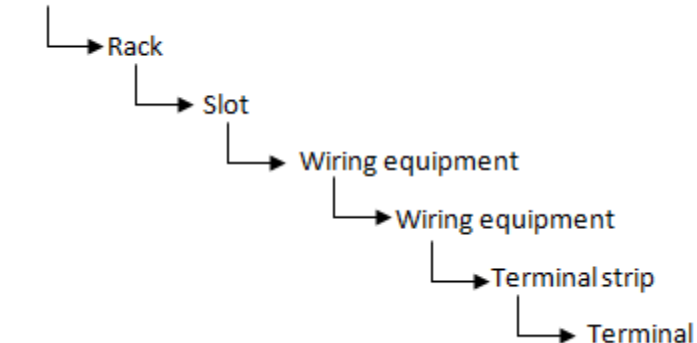
Example 2:

Panel



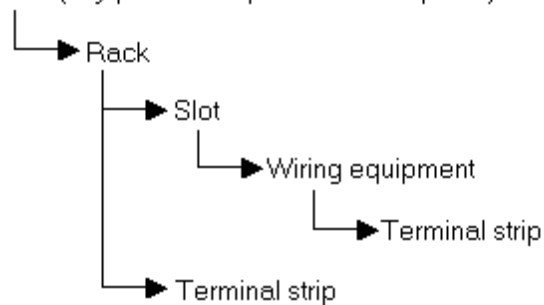
Example 3:

Panel



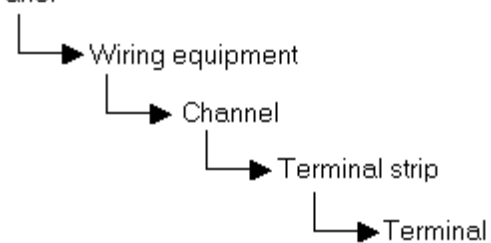
Example 4:

Panel (any panel except for a device panel)



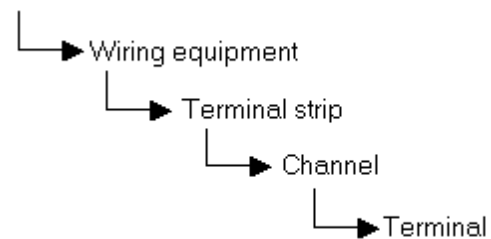
Example 5:

Panel



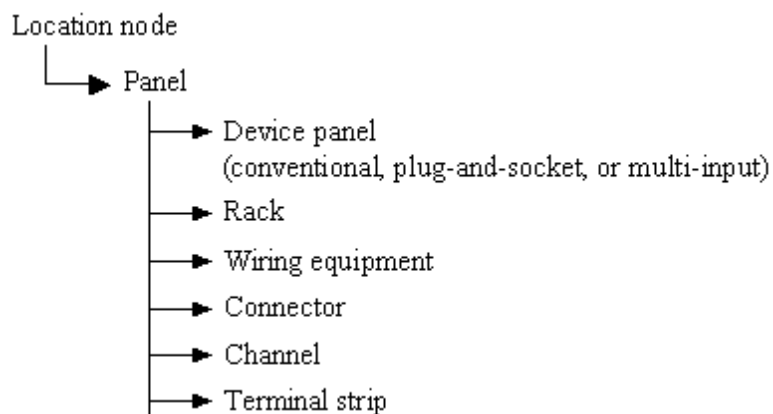
Example 6:

Panel

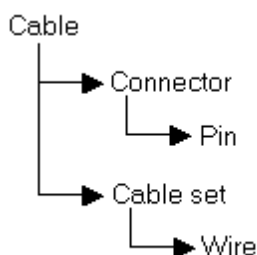


Panels by Location Hierarchy Example

The following is an example of a panel by location hierarchy structure:



Cable Hierarchy Example



Fieldbus Segments in the Domain Explorer

The **Fieldbus Segments** folder displays all the segments, their associated instrument tags and virtual tag.

All fieldbus items are arranged in a tree-like hierarchy that can be expanded and collapsed:

Icon	Explanation
	Foundation Fieldbus segment that contains all the associated instruments and virtual tags
	Profibus DP segment that contains all the associated instruments and virtual tags
	Profibus PA segment that contains all the associated instruments and virtual tags
	Fieldbus instrument associated with a segment
	Function block associated with a fieldbus instrument
	Enabled function block associated with a fieldbus instrument

Icon	Explanation
	Virtual tag associated with a fieldbus instrument

Items in the Drawing Block Types Folder

The **Drawing Block Types** folder of the **Domain Explorer** enables you to navigate to a CAD drawing block types and a drawing block in a graphical way resembling the Windows Explorer. The **Drawing Block Types** folder contains all of the blocks defined in the current <plant>. You organize your block in block type folders. The blocks that you define become available for association with instruments, loops, or hook-ups but you do make any associations in the **Drawing Block Types** folder. CAD drawing blocks appear in the **Domain Explorer** because it is only possible to define blocks at the highest plant hierarchy level.

You can expand or collapse the levels to view the existing items. To perform an action, right-click the **Drawing Block Types** folder, a specific block type or a block, and then click a command. The software uses various icons beside a folder or item to indicate the status of a folder or an item, for example a view-only item, a claimed item, an item that belongs to As-Built, and so forth. For the full list of the item indicators, see *Item Status Indicators in the Domain Explorer* (on page 540). For a detailed explanation of the tree view and **Items** panes, see *Working with the Domain Explorer: An Overview* (see "Working with the Domain Explorer" on page 519).

In the **Drawing Block Types** folder, the items appear in two levels, based on the relationship among them.

Level 1: Drawing Block Types

This is the highest level in the **Drawing Block Types** folder hierarchy. At this level, the software displays all the drawing block types that exist in the current domain and allows you to add general and instrument block types and manage block type properties.

The following drawing block types are available:

- **Border and Logo**  — Shipped general block types that allow you to create logo and border blocks for all loop drawings or hook-up drawings. You cannot delete these block types.
- User-defined general block type  — A block type that allows you to create blocks you can use in all loop drawings in addition to the border and logo blocks. You can create as many user-defined general block types as you require by right-clicking the **Drawing Block Types** folder and clicking **New > General Block Type**. Blocks belonging to user-defined general block types cannot be assigned to hook-up drawings.
- **Loop Block**  — A shipped block type that allows you to create blocks that you can associate with the loop numbers in the **Loops** folder of the **Domain Explorer**. The **Loop Block** folder is the only folder where you can create loop blocks. You can only associate one loop block per loop. You cannot delete the **Loop Block** folder.
- Instrument block type  — A user-defined block type that allows you to create blocks that you can associate with the instrument tag numbers in the **Loops** folder of the **Domain Explorer**. You can create as many instrument block types as you require by right-clicking the **Drawing Block Types** folder and clicking **New > Instrument Block Type**.

Level 2: Drawing Blocks

CAD blocks appear under block types. Blocks do not contain child items. You can add new blocks or delete blocks that are not in use.

The following block icons are available:

-  — Logo, border, or user-defined general blocks
-  — Loop blocks
-  — Instrument blocks

Items in the Electrical Equipment Folder

The **Electrical Equipment** folder of the **Domain Explorer** enables you to view items of electrical equipment that have been retrieved from SmartPlant Electrical.

There are several sub-folders available for the following categories of electrical equipment:

- **PDBs** — for Power Distribution Boards and their associated circuits.
- **Main Equipment** — for items such as motors, heaters, and control stations that are associated with electrical equipment.
- **Control Stations** — for control stations without associations with electrical equipment.

By expanding the electrical equipment items, you can view signal (electrical tag) associations. If a particular piece of equipment does not have an associated signal, you can make an association by dragging an electrical tag from the **Electrical Tags** folder to the desired electrical equipment item.

Items in the Hook-Ups Folder

The **Hook-Ups** folder of the **Domain Explorer** enables you to navigate to a hook-up type, hook-up, hook-up item, or instrument in a graphical way resembling the Windows Explorer. You can expand or collapse the levels to view the existing items. The **Hook-Ups** folder shows you at a glance the graphical representation of the relationships that exist among the hook-up types, hook-ups, and hook-up items, instruments, and child items associated with instruments.

The **Hook-Ups** folder employs an expandable/collapsible hierarchy that allows you to navigate to relevant items and select them for use. To perform an action, right-click a folder or an item and then click a command. Note that the software uses various icons beside a folder or item to indicate the status of a folder or an item, for example a view-only item, a claimed item, an item that belongs to As-Built, and so forth. For the full list of the item indicators, see *Item Status Indicators in the Domain Explorer* (on page 540). For a detailed explanation of the tree view and **Items** panes, see *Working with the Domain Explorer: An Overview* (see "Working with the Domain Explorer" on page 519).

The software arranges the items based on the relationship among them. The display rules follow a rigid structure of the following four levels.

Level 1: Hook-Up Types and Hook-Ups

This is the highest level in the **Hook-Ups** folder hierarchy. At this level, the software displays both all the hook-ups types and hook-ups that exist in the current domain. Hook-up types are shown as  and hook-ups as .

Hook-up types contain hook-ups for instruments sharing similar features, for example, Control, Measure, Flow, and so forth. For each hook-up type, on the shortcut menu, you can click **New** to add hook-ups. At this level, you can only create one hook-up at a time. Also, you can move hook-ups from one hook-up type to another, assign instrument tags and hook-up items. To assign tag numbers, on the shortcut menu, click **Actions > Associate Tag Numbers with Hook-Ups**. To assign hook-up items, on the shortcut menu, click **Actions > Associate Items with Hook-Ups**. Also, at this level, you can generate various hook-up reports, a Bill of Material, and hook-up drawings.

Level 2: Hook-Ups

Hook-ups (shown as ) appear under hook-up types. At this level, you can create hook-ups in batch mode by duplicating existing hook-ups you select in the **Items** pane. You can move hook-ups from one hook-up type to another, assign instrument tags and hook-up items. To assign tag numbers, on the shortcut menu, click **Actions > Associate Tag Numbers with Hook-Ups**. To assign hook-up items, on the shortcut menu, click **Actions > Associate Items with Hook-Ups**. Also, at this level, you can generate various hook-up reports, a Bill of Material, and hook-up drawings.

Level 3: Hook-Up Items and Instruments

Hook-Up Items

Hook-up items (shown as ) appear under hook-ups. Hook-up items do not contain child items. To assign hook-up items to hook-ups, use a shortcut menu command available at the level of hook-ups or hook-up types. You cannot create or delete hook-up items in the **Domain Explorer**. Hook-up item management options are only available in the **Hook-Up Item Libraries** folder of the **Reference Explorer**.

Instruments

Instruments (shown as ) appear under hook-ups. Instruments can contain document assigned to instrument specs, process data, or calculation sheets. Also, instruments can contain control system tags. You create documents and control system tags in the appropriate modules of SmartPlant Instrumentation. To assign instrument tag numbers to hook-ups, use the shortcut menu command available at the first or second level of the folder hierarchy.

Level 4: Control System Tags, Documents, and Instrument Blocks

Control System Tag

Control system tags (shown as ) appear under instruments at the lowest level of the **Hook-Ups** folder hierarchy. It is possible to assign control system tags to instruments when performing I/O assignment.

Documents

Documents (shown as ) appear under instruments at the lowest level of the folder hierarchy. You define documents when creating specs, process data sheets, or calculation sheets. You can modify or delete document data in the module pertaining to the document displayed. For example, if you delete an instrument specification from the Specifications module, the software automatically removes the document from the **Hook-Ups** folder. Use the shortcut menu command to open documents. The software opens the document in the module in which the document was created.

Instrument Blocks

Instrument blocks are represented by icons  and . In the **Hook-Ups** folder, instrument block options are not in use because they are only used in a CAD loop drawing generation. You manage instrument blocks in the **Loops** folder.

Items in the Loops Folder

The **Loops** folder of the **Domain Explorer** enables you to navigate to a loop number, tag number, or CAD block in a graphical way resembling the Windows Explorer. You can expand or collapse the levels to view the existing loop numbers, tag numbers, and CAD blocks. The **Loops** folder shows you at a glance the graphical representation of the relationships that exist among the loops, instruments, and blocks.

To perform an action, right-click the **Loops** folder or an item and then click a command. Note that the software uses various icons beside a folder or item to indicate the status of a folder or an item, for example a view-only item, a claimed item, an item that belongs to As-Built, and so forth. For the full list of the item indicators, see *Item Status Indicators in the Domain Explorer* (on page 540). For a detailed explanation of the tree view and **Items** panes, see *Working with the Domain Explorer* (on page 519).

The software arranges the items in three levels based on the relationship among them.

Level 1: Loops

This is the highest level in the **Loops** folder. This hierarchy level contains all the loop numbers existing at the current highest plant hierarchy level. Loops are indicated with the  icon. Loops contain tag numbers, which in turn contain blocks. For each loop, on the shortcut menu, you can click **New** to add instruments. Also, you can assign documents to loops. These documents are associated with drawings that you generate for the loop. Loops can display annotations which refer to the generation method you assigned for that loop, for example, **C** indicates a CAD method, **M** indicates a manual method (intended for generation without using SmartPlant Instrumentation options).

Level 2: Instruments, Loop Blocks, and Documents

Instruments

The second hierarchy level contains all the instrument tag numbers that are associated with the existing loops. Instruments are shown as .

If you use a CAD application to generate loop drawings, under instrument tags, you can add instrument blocks using the following block assignment methods:

Block-tag assignment — Allows you to assign a block to a tag number manually, using the shortcut menu command **Associate Blocks with Tag Numbers**.

Block-instrument type assignment — Allows you to assign a block to the instrument type, and, thus, assign this block to all the tag numbers that belong to this instrument type. To perform this operation, on the **Actions** menu of the **Loop Drawings Module** window, click **Block-Instrument Type Assignment**.

Loop Blocks

If you use a CAD application to generate loop drawings, at the second level of the **Loops** folder hierarchy, you can assign CAD drawing blocks to the loop. Loop blocks are indicated with the  icon.

In the **Domain Explorer**, you create and manage loop blocks in the **Drawing Block Types > Loop Block** folder.

Documents

The second hierarchy level contains all the documents that are associated with the loop drawings you generated. Documents are indicated with the  icon.

The software assigns a document number to a loop on loop creation. However, in the **Loops** folder, the software only displays a document number after generating a drawing for a loop. You can view and modify document numbers using options of the **Loop Drawing List** dialog box, which you can open using a shortcut menu command.

Level 3: Instrument Blocks and Control System Tags

Instrument Blocks

Instrument blocks, which are used in a CAD loop drawing generation, are the lowest level in the **Loops** folder hierarchy. The displayed blocks are those blocks that you associated with the instrument tag numbers according to the method of association. The block icons that the software displays depend on the block assignment method:

-  — Indicates blocks associated with instrument tags manually. At the instrument level, on the shortcut menu, click **Actions > Associate Blocks with Tag Numbers**.
-  — Indicates blocks associated with a specific instrument type to which the instruments belong. On the **Actions** menu of the **Loop Drawings Module** window, click **Block – Instrument Type Assignment**.

You create and manage instrument blocks in the **Drawing Block Types** folder of the **Domain Explorer**, where the instrument blocks are indicated with the  icon.

Control System Tags

Control system tags appear at the lowest level of the **Loops** folder hierarchy, under instruments. You manage control system tags in the **I/O Assignment** window. In the **Loops** folder, you can only update the control system tag properties. Control system tags are shown as .

Association Rules in the Domain Explorer

You can move and create associations among items by dragging them from one parent item to another in the **Domain Explorer**. The following table summarizes the rules that govern these associations.

Source Item in the Domain Explorer	Target Folder or Item in the Domain Explorer	Result	Pre- conditions
Loop	The Loops folder in another <unit>	The software moves the loop to the target <unit>.	
Loop	P&ID drawing	The software associates the loop with the target P&ID drawing.	
Instrument	The Instruments folder in another <unit>	The software moves the instrument to the target <unit>.	
Instrument	Loop	The software associates the instrument with the target loop.	
Instrument	Line	The software associates the instrument with the target line.	
Instrument	Process equipment	The software associates the instrument with the target process equipment.	
Instrument	P&ID drawing	The software associates the instrument with the target P&ID drawing.	
Functional requirement tag	The Loops folder in another <unit>	The software moves the functional requirement tag to the target <unit>.	
Location	Location	The software moves the location to the target location in the Panels by Location folder (in accordance with the location level structure defined by the Domain Administrator).	
Panel (all panel categories)	Location	The software associates the panel with the target location.	
Device panel	Panel (apart from device panel and plug-and- socket junction box)	The software moves the device panel to the target panel.	
Plug-and- Socket junction box	Panel (apart from device panel and plug-and- socket junction box)	The software moves the plug-and- socket junction box to the target panel.	
Rack	Panel (apart from device panel and plug-and- socket junction box)	The software moves the rack to the target panel.	

Source Item in the Domain Explorer	Target Folder or Item in the Domain Explorer	Result	Pre- conditions
Wiring equipment item (for example: I/O card, fieldbus brick, and so forth)	Panel (apart from device panel and plug-and- socket junction box)	The software moves the wiring equipment item to the target panel.	See Note 1.
Wiring equipment item (for example: I/O card, fieldbus brick, and so forth)	Rack	The software moves the wiring equipment item to the target rack.	See Note 1.
Wiring equipment item (for example: I/O card, fieldbus brick, and so forth)	Terminal strip	The software moves the wiring equipment item to the target terminal strip.	See Note 1.
Wiring equipment item (for example: I/O card, fieldbus brick, and so forth)	Slot	The software moves the loop to the target slot.	See bullet 1 below.
Connector	Panel (apart from device panel and plug-and- socket junction box)	The software moves the connector to the target panel.	See bullets 2 and 3 below.
Connector	Rack	The software moves the connector to the target rack.	See bullets 2 and 3 below.
Connector	Wiring equipment item	The software moves the connector to the target wiring equipment item .	See bullets 2 and 3 below.
Connector	Slot	The software moves the connector to the target slot.	See bullets 2 and 3 below.
Connector	Cable	The software moves the connector to the target cable.	See bullets 2 and 3 below.
Terminal strip	Panel (apart from device panel and plug-and- socket junction box)	The software moves the terminal strip to the target panel.	See bullet 4 below.
Terminal strip	Rack	The software moves the terminal strip to the target rack.	See bullet 4 below.
Terminal strip	Wiring equipment item (e.g., I/O card, fieldbus brick, etc.)	The software moves the terminal strip to the target wiring equipment item.	See bullet 4 below.
Terminal strip	Slot	The software moves the terminal strip to the target slot.	See bullet 4 below.

Source Item in the Domain Explorer	Target Folder or Item in the Domain Explorer	Result	Pre- conditions
Terminal	Terminal strip	The software moves the terminal to the target terminal strip.	
Terminal	Channel	The software moves the terminal to the target channel.	
Channel	Wiring equipment item (for example: I/O card, fieldbus brick, and so forth)	The software moves the channel to the target wiring equipment item.	
Channel	Terminal strip	The software moves the channel to the target wiring terminal strip.	
Cable set	Cable	The software moves the cable set to the target cable.	
Cable set	Cross cable	The software moves the cable set to the target cross cable.	
Wire	Cable set	The software moves the wire to the target cable set.	Connected wires cannot be moved.
Line	P&ID drawing	The software associates the line with the target P&ID drawing.	
Hook-Up	Hook-up type	The software associates the hook-up with the target hook-up type.	

NOTES

- I/O cards cannot be moved if they function as primary or secondary I/O cards.
- Wiring equipment connectors cannot be moved to cables.
- Cable connectors can only be moved to other cables. This is possible only if none of the connector pins are associated with wires.
- Terminal strips cannot be moved if:
 - They are used in instrument type profile definition.
 - They are associated with Auto-Wiring tasks.
 - They are associated with CS tags.
 - They are associated with general or local signals.

Special Conditions

- The software does not allow you to drag items to incompatible hierarchies. For example, you cannot drag a rack to device panel or a plug-and-socket junction box.
- The software does not allow you to move an item that contains a child item that cannot be moved. For example, you cannot move a rack if it contains an I/O card that functions as a primary or secondary I/O card for an I/O termination.

- In an owner operator domain, you cannot move items that have not been claimed for the current project.

Item Status Indicators in the Domain Explorer

The software uses a number of icons to indicate the status of various folders and items in your domain. The icons appear beside the folders and items in the tree view of the **Domain Explorer**.

Icon	Description
	An item that belongs to the current project.
	An item that belongs to As-Built. When working in a project with As-Built items displayed, As-Built items are view-only. In the Domain Explorer , you can select an As-Built item and display its properties.
	A dummy item.
	An item that does not belong to the current project or As-Built. Also, an item that belongs to As-Built and all the projects, for a example, a hook-up type.
	An item that cannot be deleted, duplicated, and under which no child items can be created. However, you can edit the item properties and move the item to another hierarchy level.
	Access denied.
	View-only. The item is marked as view-only if it has not been created using the Domain Explorer . You cannot delete such an item or manage the item properties using the Domain Explorer options. For example, a document, such as a specification is always marked as view-only. However, you can open the spec print preview and make changes as you require.
	An item that cannot be deleted, duplicated, moved to another hierarchy level, and under which no child items can be created. However, you can edit the item properties.
	An As-Built item that has been claimed for a project.
	Indicates that a folder or parent hierarchy item has been filtered according to an item type.
	Indicates that a folder or parent hierarchy item has been filtered according to an item type name.

NOTES

- An item without any indicator denotes an item that is not supported by the **Domain Explorer**. The software allows you to perform actions with such items only from the pertinent SmartPlant Instrumentation modules.
- The software does not use item indicators in the **Reference Explorer**.

Create an Item in the Domain Explorer

1. Press F7 to open the **Domain Explorer**.
2. In the tree view pane, expand the plant hierarchy to display the folder in which you need to create the new item .
3. Right-click the folder in which you need to create the new item .
4. On the shortcut menu, point to **New** and then click the command that you require.

NOTE When you create an item in the domain explorer, make sure you set the naming convention for it in the Administration module. For details, see Naming Conventions in the *Administration User's Guide*, under *Domain Administration*.

Duplicate an Item

1. Do one of the following:
 - Press F7 to open the **Domain Explorer**.
 - Press F8 to open the **Reference Explorer**.
2. In the tree view pane, expand the plant hierarchy.
3. Do one of the following:
 - In the tree view pane, select an item.
 - In the **Items** pane, select one or more items.
4. Right-click the selected items and then on the shortcut menu, click **Duplicate**.
5. Modify the properties as you require. For help with individual properties, click the **Help** button on the dialog box.

NOTE When you duplicate an item in the domain explorer, the duplicate item inherits the naming conventions from the original item. Make sure you set the naming convention for an item you wish to duplicate.

Move an Item in the Domain Explorer

1. Press F7 to open the **Domain Explorer**.
2. In the tree view pane, expand a hierarchy to display the item that you want to move.
3. Drag your selection to the required destination in the **Domain Explorer**.

Edit Item Properties

1. Do one of the following:
 - Press F7 to open the **Domain Explorer**.
 - Press F8 to open the **Reference Explorer**.
2. In the tree view pane, expand the plant hierarchy.
3. Do one of the following:
 - In the tree view pane, select an item .
 - In the **Items** pane, select one or more items.
4. Right-click the selected items and then on the shortcut menu, click **Properties**.
5. Modify the properties as you require. For help with individual properties, click the **Help** button on the dialog box.

Delete Items

1. Press F7 to open the **Domain Explorer** or F8 to open the **Reference Explorer**.
2. In the tree view pane, expand the plant hierarchy.
3. Do one of the following:
 - In the tree view pane, select an item .
 - In the **Items** pane, select one or more items.
4. Right-click the selected items and then on the shortcut menu, click **Delete**.

Perform Various Actions with an Instrument

1. Press F7 to open the **Domain Explorer**.
2. In the tree view pane, expand the plant hierarchy to display the **Instruments** folder.
3. Expand the **Instruments** folder and then right-click a tag number.
4. On the shortcut menu, point to **Actions** and then click the command that you require.

Generate a Report for an Instrument

1. Press F7 to open the **Domain Explorer**.
2. In the tree view pane, expand the plant hierarchy to display the **Instruments** folder.
3. Expand the **Instruments** folder and then right-click a tag number.
4. On the shortcut menu, click **Reports** and then click the command that you require.

Generate a Specification or a Process Data Sheet for an Instrument

1. Press F7 to open the **Domain Explorer**.
2. In the tree view pane, expand the plant hierarchy to display the **Instruments** folder.
3. Expand the **Instruments** folder and then right-click a tag number.
4. On the shortcut menu, click **Actions** and then click the command that you require.

Copy a Reference Item to the Domain Explorer

1. Press F7 and then F8 to open the **Domain Explorer** and the **Reference Explorer**.
2. In the **Reference Explorer**, expand a hierarchy level and select a reference item.
3. Drag your selection to a destination level in the **Domain Explorer**. Place both **Explorer** windows side by side on your screen and then drag the required items from one **Explorer** to the other.
4. In the appropriate properties dialog box, (depending on the reference item that you are copying), modify the properties of the new item as you require.

Search for Items in SmartPlant Instrumentation Explorer

1. Do one of the following
 - Press F7 to open the **Domain Explorer**.
 - Press F8 to open the **Reference Explorer**.
2. On the toolbar, click  to open the **Search** dialog box.
3. Select an item type.

NOTE The **Item type** list is a required field and without selecting an item type, the software cannot proceed with the search.
4. Under **Item name**, type a name of an item that you want to find.

TIP You can use wildcard characters (* or %) to find items whose names contain part of the text that you type. If you do not know the item name, leave the asterisk * in this field.
5. Under **Search in**, select a plant hierarchy level on which the software searches for items:
 - **Entire domain** — the current domain that you selected in the **Open** dialog box when you started SmartPlant Instrumentation.

- **Current highest plant hierarchy level** — the highest plant hierarchy level that you selected in the **Open** dialog box, for example, your current plant.
 - **Current lowest plant hierarchy level** — the lowest plant hierarchy level that you selected in the **Open** dialog box, for example, your current unit.
6. In the **Item properties** data window, if needed, specify item properties so that the software looks for items with those properties only. Click **Add** to append a new row if you want to specify more than one property.
 - **Property** — select an existing property from the list.
 - **Operator** — select an operator from the list to determine how the selected property will relate to the expression you type in the **Value** field.
 - **Value** — type an appropriate value to determine how the selected property will be specified.
 - **Logic** — select a logic operator (AND or OR) to determine how the next expression will relate to the current one. Leave this field empty if this is the last expression you are defining.
 7. Click **Search Now**.
 8. In the **Results** data window, select the items that you want to work with and click **Add to My List**.

NOTES

- After the software finds the items that you were looking for and lists them in the **Results** data window, you can search for more items without losing your current results. Select another item type and click **Search Now**. The software adds the newly found items to the previously found results.
- To start a new search and clear the **Search results** data window.

Find an Item in the Tree View of an Explorer Window

1. Do one of the following:
 - Press F7 to open the **Domain Explorer**.
 - Press F8 to open the **Reference Explorer**.
2. In the tree view pane, expand the tree view hierarchy and navigate to a folder.
3. Right-click the folder that you require and then on the shortcut menu, click **Find Item**.
4. On the **Find Item** dialog box, select **Match case** if you want the software to find items whose names match the capitalization of the item name you entered.
5. Select **Find whole name only** if you want the software to search for occurrences that are whole names and not part of a larger item name.
6. Do one of the following:
 - Under **Item**, type a name and click **Find**.
 - Select **As typed** and then under **Item** type a name. The software looks for the item as you type. You can set the search delay to determine how long the software will wait after the last time you press a key on your keyboard.
7. Click **Close**.

Filter the Display of Items According to a Specific Item Name

1. In an **Explorer** window, do one of the following:
 - Without selecting anything in the **Explorer** window, click  on the toolbar.
 - Right-click the root node in the **Explorer** tree view and then on the shortcut menu, click **Filter**.
2. On the **Filter Definition** dialog box, type a filter name as you require.
3. On the **Item Name** tab, under **Item name**, type a valid name or part of a name. You can use wildcard characters to specify partial strings: asterisk (*) or percent (%) for multiple characters and underscore (_) for single characters.
4. Select the **Override all item type filters** check box if you want this item name filter the software to override all existing item type filters. Normally, item name filters do not take effect if an item type filter exists.
5. To filter the data of the current lowest plant hierarchy level, select the **Current lowest plant hierarchy level** check box.
6. To limit the display of items to only those that were created by the current user, select the **Show items created by the current user only** check box.
7. Click **OK**.

NOTES

- To clear the filter, on the **Filter Definition** dialog box, delete the filter definition.
- Filter settings take effect only for the user who defined the filter and only for the current custom view of the active **Explorer** window.
- Item type filters override your item name filters.

Filter the Display of Items According to a Specific Item Type

1. In an **Explorer** window, do one of the following:
 - To filter the entire tree view, select a hierarchy node whose immediate child items are folders and not plant items. Then click  on the toolbar.
 - To filter a particular folder or a hierarchy node, select a hierarchy node or a folder containing the items that you want to filter and then click . Alternatively, you can right-click a folder or a hierarchy node and then on the shortcut menu, click **Filter**.
2. On the **Filter Definition** dialog box, type a filter name as you require.
3. On the **Item Type** tab, from the **Item type** list, select an item type appropriate to the folder or parent node that you selected in the tree view.
4. Select one of the following options:
 - If, in the **Explorer** tree view, you selected a hierarchy node whose immediate child items are folders and not plant items, click the **All the tree view** option button.
 - If you selected a particular folder or hierarchy node, click the **Selected folder or parent item** option button.
5. From the **Item type** list, select an item type according to which you want to set the filter.
TIP If, in the **Explorer** tree view, you select a hierarchy node whose immediate child items are folders and not plant items, the **Item type** list contains all the item types of the child items that belong to the selected folders.
6. In the **Filter definition** group box, define the criteria that you use to filter the items displayed:

- **Property** — select a property to use for filtering the items.
 - **Operator** — select the required comparison operator to determine how the header selected under **Property** will relate to the expression you select for **Value**.
 - **Value** — select or type a required value for the item you selected under **Property**. The available values depend on the specific property that you select.
 - **Logic** — You use this option when you specify more than one filter condition. The option allows you to select the required logical operator (And or Or) to determine how the next filter expression will relate to the current expression. When you have a mixture of logical operators for several conditions, the software performs the expressions on the conditions in order, for example:
 (A and B) or C
 (A or B) and C
7. Click **Add** if you want to add another item type property to the filter definition.
 8. Click **Verify** to check the validity of the current filtering condition.
 9. To filter the data of the current lowest plant hierarchy level, select the **Current lowest plant hierarchy level** check box.
 10. To limit the display of items to only those that were created by the current user, select the **Show items created by the current user only** check box.
 11. Click **OK**.

NOTES

- Clicking **Advanced** allows you to define an additional filter for the **Cables**, **Cross Cables**, and **Loops** folders. For details, see *Filter Cables in an Explorer Window* (on page 545) and *Filter Loops in an Explorer Window* (on page 546).
- To reset the filter, click **Reset**.
- To clear the filter, right-click a hierarchy node and then on the shortcut menu, click **Clear Filter**.
- When filtering the entire domain or setting a filter without selecting a specific node or folder, the **Clear Filter** command is not available. In this case, to clear the filter, open the **Filter Definition** dialog box and delete the filter definition.
- Filter settings take effect only for the user who defined the filter and only for the current custom view of the active **Explorer** window.
- Item type filters override your item name filters.

Filter Cables in an Explorer Window

1. In an **Explorer** window, select the **Cables** or the **Cross Cables** folder and do one of the following:
 - Right-click the folder, and then click **Filter**.
 - On the **Explorer** window toolbar, click .
2. On the **Filter Definition (Cables)** dialog box, type a filter name.
3. Click **Advanced**.
4. On the **Advanced Filter Definition (Cables)** dialog box, do one of the following:
 - Select the **Look for connections** check box to include and select connection criteria in the filter condition.
 - Clear the **Look for connections** check box if you do not want to include any of the connection criteria in the filter condition. Selecting this option disables the check boxes in this group box and in the **Connected to** group box.
5. To select a connection criterion, in the **Connection** group box, click the following:

- **No connections on either end** — Filters for cables that are not connected to anything on either wire end.
 - **At least one wire connected on one end only** — Filters for cables that contain at least one wire that is only connected on one of its ends.
 - **At least one wire connected on both ends** — Filters for cables that contain at least one wire that is connected on both wire ends.
6. In the **Connected to** group box, select one or more check boxes to define a filter according to the type of panel that is connected to the cable. This selection defines connection criteria for cables that have at least one wire connected to one or both ends.
 - **Junction boxes** — Filter for all the cables that are connected to junction boxes.
 - **Marshaling racks** — Filter for all the cables that are connected to marshaling racks.
 - **Cabinets** — Filter for all the cables that are connected to cabinets.
 - **Device panels** — Filter for all the cables that are connected to device panels.
 - **DCS panels** — Filter for all the cables that are connected to DCS panels.
 - **PLC panels** — Filter for all the cables that are connected to DCS panels.
 7. In the **Cable associations** group box, select an appropriate Foundation Fieldbus or Profibus segment if you want to filter for cables that are associated with a specific fieldbus segment.
 8. Select the **Display telecom cables** check box only if you want to filter the **Cables** folder so that it displays telecom cables only.
 9. Select the **Cables without sets** check box to filter for cables that were created without sets and wires. This feature is useful when creating a cable block diagram.
 10. Click **OK** in the **Advanced Filter Definition (Cables)** dialog box.
 11. Click **OK** in the **Filter Definition** dialog box.

Define a Filter for Pre-Assigned Device Cables

1. In the **Domain Explorer**, click .
2. On the **Filter Definition (Cables)** dialog box, click **Advanced**.
3. On the **Advanced Filter Definition (Cables)** dialog box, select the **Display pre-assigned device cables only** check box.
4. Select the junction box that you require from the list below.

Filter Loops in an Explorer Window

1. In an **Explorer** window, select the **Loops** folder and do one of the following:
 - Right-click the folder, and then click **Filter**.
 - On the **Explorer** window toolbar, click .
2. To filter according to an item name in the **Loops** folder, under **Item name**, type a valid name or part of a name. You can use wildcard characters to specify partial strings: asterisk (*) or percent (%) for multiple characters and underscore (_) for single characters.

TIP The value that you enter in this box overrides all other filter criteria in this dialog box.
3. Type a filter name.
4. Do one of the following:
 - Select **Selected node definition** to filter the child items that belong to a folder or the items at any hierarchy level that you selected in the **Explorer** tree view.

- Select **Global definition** to define a filter for the entire tree view of the active **Explorer**. The software applies this definition to the item type you selected. If you defined a filter definition for a specific folder, the filter for the folder overrides the settings for the global filter definition.
5. In the **Filter definition** group box, define the criteria that you use to filter the items displayed:
 - **Property** — select a property to use for filtering the items.
 - **Operator** — select the required comparison operator to determine how the header selected under **Property** will relate to the expression you select for **Value**.
 - **Value** — select or type a required value for the item you selected under **Property**. The available values depend on the specific property that you select.
 - **Logic** — You use this option when you specify more than one filter condition. The option allows you to select the required logical operator (And or Or) to determine how the next filter expression will relate to the current expression. When you have a mixture of logical operators for several conditions, the software performs the expressions on the conditions in order, for example:
 (A and B) or C
 (A or B) and C
 6. Click **Verify** to check the validity of the current filtering condition.
 7. Click **Advanced** to define a filter for loops according to loop blocks.
 8. In the dialog box that opens, if needed, under **Display level for blocks**, click one of the following to filter the blocks displayed in the data windows:
 - **Highest plant hierarchy level** — Displays blocks on the highest level of the plant hierarchy defined by the Domain Administrator. The default level is Plant.
 - **Lowest plant hierarchy level** — Displays blocks on the lowest level of the plant hierarchy defined by the Domain Administrator. The default level is Unit.
 9. To filter the loops according to blocks, do one of the following:
 - Under **Blocks associated with tags**, select one or more blocks that are associated with loop tags. After you select these blocks, in the current explorer window, the software only displays loops whose blocks are assigned to tags using the block-tag assignment method.
 - Under **Blocks associated with instrument type**, select one or more blocks that are associated with the instrument type of the loop tags. After you select these blocks, in the current explorer window, the software only displays loops whose blocks are assigned to tags using the block-instrument type assignment method.
- TIP** In the **Loops** folder, blocks associated with tags using the manual block assignment method are marked with the icon . Blocks associated with tags using the automatic block assignment method are marked with the icon .
10. Click **OK** in the **Advanced Filter Definition (Loops)** dialog box.
 11. Click **OK** in the **Filter Definition** dialog box.

Display a Browser View in the Explorer Items Pane

1. Do one of the following
 - In the tree view pane of the **Domain Explorer**, expand the plant hierarchy and then select a folder or an item .
 - In the tree view pane of the **Reference Explorer**, select a folder or an item .
2. Right-click the selected folder or item and then on the shortcut menu, click **Show Browser**.
3. From the **Browser view** list, select a Browser view that exists in the Browser module.

4. **IMPORTANT** If there are no Browser views on this list or if the browser view you need is not on the list, close the **Show Browser** dialog box and switch to the Browser module. In the Browser Manager, open the style settings of the browser view that you need. Select the **Enable current view in SmartPlant Explorer and in the Find Documents to Publish wizard** check box and then click **Save**. Open the **Show Browser** dialog box again and select the browser view that you need.

Add Items to My List in the Items Pane

- Press F7 to open the **Domain Explorer** and do one of the following:
 - In the **Domain Explorer** tree view, right-click an item and then on the shortcut menu, click **Add to My List**.
 - In the **Items** pane, click **My List** and then drag an item from the tree view to **My List**.

NOTES

- To remove an item from **My List**, right-click it and then on the shortcut menu, click **Remove from My List**.
- To clear the **My List** view of all the items, right-click an item and then on the shortcut menu, click **Remove All**.

Define and Use a Custom View

1. Press F7 to open the **Domain Explorer** or F8 to open the **Reference Explorer**.
2. Click  above the toolbar.
3. On the **Custom View Properties** dialog box, click **New**.
4. Type a custom view name and then click **OK**.
5. Do one of the following:
 - Right-click a single folder in the tree view pane.
 - Right-click multiple folders in the **Items** pane.
6. On the shortcut menu, click **Add to Custom View** and then click the command for the appropriate custom view.

NOTE To remove a folder from a custom view, right-click a folder and then on the shortcut menu, click **Remove from Custom View**.

SECTION 37

Working with the Reference Explorer

The **Reference Explorer** allows you to create and manage all the available wiring reference items that are created by SmartPlant Instrumentation users and that are provided with the software. Note that wiring reference items are typical configurations that facilitate rapid creation of various wiring items in your domain.

The **Reference Explorer** displays a graphical representation of the relationships that exist among the predefined wiring equipment, panels, terminal strips, and terminals as well as cables, cable sets, and wires. Also, you can manage hook-up libraries and hook-up items.

You can use predefined configurations as reference items and copy them to the **Domain Explorer**. For more information about using reference wiring items, see *Copy a Reference Item to the Domain Explorer* (on page 542).

You can open the **Reference Explorer** from anywhere in SmartPlant Instrumentation. Press F8 or on the **Tools** menu, click **Reference Explorer**.

The tree view pane of the **Reference Explorer** shows reference items organized by folders. SmartPlant Instrumentation defines standard folders in the database. You cannot move or delete these folders, nor can you add new folders. Each folder contains a particular item type, and the options available on the shortcut menus depend on the currently selected item type.

Item status indicators — the software uses various icons beside a folder or item to indicate the status of a folder or an item, for example **access denied**, **view only**, **an item that belongs to As-Built**, and so forth. For the full list of the item indicators, see *Item Status Indicators in the Domain Explorer* (on page 540).

NOTES

- You can create several instances of the **Reference Explorer** by pressing F8.
- After exiting SmartPlant Instrumentation, and starting a new session, the software retains the size and position of all the windows that were open in the previous session.

Reference Explorer

The **Reference Explorer** allows you to create and manage all the available wiring reference items that are created by SmartPlant Instrumentation users and that are provided with the software. Note that wiring reference items are typical configurations that facilitate rapid creation of various wiring items in your domain.

The **Reference Explorer** displays a graphical representation of the relationships that exist among the predefined wiring equipment, panels, terminal strips, and terminals as well as cables, cable sets, and wires. Also, you can manage hook-up libraries and hook-up items.

You can use predefined configurations as reference items and copy them to the **Domain Explorer**. For more information about using reference items, see *Copying Reference Items*.

You can open the **Reference Explorer** from anywhere in SmartPlant Instrumentation. Press F8 or click **Tools > Reference Explorer**.

The main features of the **Reference Explorer** are as follows.

(List of Views) — Allows you to select the standard **Reference Explorer** view or a custom view that you have defined. To add items to a custom view, right-click a folder in the tree view pane or multiple folders in the **Items** pane and then on the shortcut menu click **Add to Custom View** and then click an appropriate custom view command.

New Custom View  — Opens the **Custom View Properties** dialog box where you can define custom views.

Toolbar

Search  — Opens the **Search** dialog box where you can look for items that you want to work with.

Refresh  — Updates the **Reference Explorer** display. This feature is useful where multiple users are working on the same set of data.

Filter  — Allows you to filter the items in the **Reference Explorer** display. You can use this toolbar command if you do one of the following:

- Do not select anything in the **Explorer** tree view — this allows you to filter the entire tree view according to a specific item name.
- Select the root node in the **Explorer** tree view — this allows you to filter the entire tree view according to a specific item name.
- Select a tree view node whose immediate child items are folders and not plant items — this allows you to filter the entire tree view according to a specific item type that you select from the **Item type** list on the **Filter Definition** dialog box.
- Select any tree view node or folder that contains child item to filter that node or folder according to a specific item type.

View  — Toggles through each view of the items in the **Items** pane. You can click the arrow and select the desired view.

Find  — Opens the **Find Item** dialog box where you can look for a specific item in the tree view.

Print  — Prints the browser view that you selected for the current hierarchy node. This button becomes available only after selecting the **Show Browser** command.

Tree View Pane

The tree view pane of the **Reference Explorer** shows reference items organized by folders. SmartPlant Instrumentation defines standard folders in the database. You cannot move or delete these folders, nor can you add new folders. Each folder contains a particular item type, and the options available on the menus depend on the selected item type.

Expand or collapse the hierarchy by clicking the  and  icons respectively or by double-clicking a folder.

After double-clicking **Reference Explorer**, which is the top level in the tree view, you can see the **Panels**, **Cables**, and **Wiring Equipment** folders. These folders contain other folders which in turn hold reference items.

You can navigate to a reference item by expanding a folder and then double-clicking an item to display the existing child items. If you cannot expand a folder, that folder is empty.

To perform an action, right-click a folder or an item and then click a command. Also, to move an item to another parent item, drag that item to another folder or a parent item as you require.

For a detailed explanation of all the folders in the **Reference Explorer**, see *The Organization of Items in the Reference Explorer Tree View* (on page 554).

Item status indicators — the software uses various icons beside a folder or item to indicate the status of a folder or an item, for example **access denied**, **view only**, **an item that belongs to As-Built**, and so forth. For the full list of the item indicators, see *Item Status Indicators in the Domain Explorer* (on page 540).

Items Pane

The **Items** pane (list view) pane of the **Reference Explorer** displays the individual items that comprise the hierarchy of the item or the folder that you selected in the tree view. You can choose one of the following three ways to display the items in this pane:

- **List** — Displays the individual items that comprise the hierarchy of the item or the folder that you selected in the tree view.
- **My List** — Allows you to create a special view of the **Items** pane where you can keep items that belong to various folders in the tree view. The software retains all the items in the **My List** view until you remove them from that list. The list count displays the number of items displayed in the **List** pane.
- **Show Browser** — Allows you to display a browser view in the **Items** pane for an item type or a folder that you select in the **Reference Explorer** tree view. This way, instead of displaying child items, you can display item properties of the item you selected in the tree view pane. The software allows you to print out the current browser view, however, you cannot edit the item properties.
- **List count** — displays the number of individual items that comprise the hierarchy of the item or the folder that you selected in the tree view.

NOTES

- You can create several instances of the **Reference Explorer** by pressing F8.
- After exiting SmartPlant Instrumentation, and starting a new session, the software retains the size and position of all the windows that were open in the previous session.

Reference Explorer Common Tasks

The following tasks are used frequently when you work with the **Reference Explorer**.

Create a Reference Item

This procedure shows how to create an item in the **Reference Explorer**. For more information, see *Create a Reference Item* (on page 556).

Create a Reference I/O Card

This procedure explains how to create a reference I/O card. For more information, see *Create a Reference I/O Card* (on page 556).

Create a Reference I/O Termination

This procedure explains how to create a reference I/O termination. For more information, see *Create a Reference I/O Termination* (on page 558).

Create a Reference Wiring Equipment Item

This procedure explains how to create a reference wiring equipment item. For more information, see *Create a Reference Wiring Equipment Item* (on page 558).

Copy a Reference Item to the Domain Explorer

This procedure explains how to copy a reference item from the **Reference Explorer** to the **Domain Explorer**. This way you can create numerous plant items based on typical configurations on the fly. Note that SmartPlant Instrumentation allows you to preserve the internal connections within a copied item. This means that the software retains the cables and cross wires that connect among the various terminal strips within the item that you are copying. Also, if you are copying a panel or another item that contains child items, the software duplicates this item in its entirety, including all the existing child items.

For more information, see *Copy a Reference Item to the Domain Explorer* (on page 542).

Edit Item Properties

This procedure explains how to edit the properties of an item that you select in the **Reference Explorer**. For more information, see *Edit Item Properties* (on page 541).

Duplicate an Item

You use this action to create a duplicate item within the same parent hierarchy. That is, the software creates another copy of the selected item under the immediate parent item. For example, if you need to insert an apparatus within an existing apparatus group, expand an apparatus group and duplicate an apparatus. You can then change the sequence numbers of the apparatuses to re-arrange them on the strip the way you require. Furthermore, if you are duplicating a panel or another item that contains child items, the software duplicates this item in its entirety. That is, SmartPlant Instrumentation creates the new item with exactly the same child items as the original panel. Note that in this case, the software also retains all the existing internal connections if you selected **Copy internal connections** in the wiring preferences. For more information, see *Duplicate an Item* (on page 541).

Delete Items

This procedure shows how to delete the items that you select in the **Reference Explorer**. For more information, see *Delete Items* (on page 541).

Search for Items in SmartPlant Instrumentation Explorer

You use this feature to find items that you want to work with. You can search for multiple items in the entire domain, the current highest plant hierarchy level, or the current lowest plant hierarchy level. The term "current" refers to the plant hierarchy level that you selected in the **Open** dialog box when you started SmartPlant Instrumentation. For more information about searching for items, see *Search for Items in SmartPlant Instrumentation Explorer* (on page 542).

Find an Item in the Tree View

This feature enables you to find an item in the **Reference Explorer** tree view. This feature is especially useful when you want to find an item in a particular folder that contains numerous items. You can type an item name and click **Find** or you can let the software look for the item as you type the item name. The feature allows you to set the search delay that determines how long the software waits after the last time you press a key on your keyboard.

For more information, see *Find an Item in the Tree View of an Explorer Window* (on page 543).

Filter the Display of Items According to a Specific Item Type

This option allows you to filter the items according to a specific item type. You can apply an item type filter to the entire tree view of the current view of the current **Explorer** window or only to a particular folder or node that contains child items. Item type filters override your item name filters.

Also, you can filter the items so that the software displays only those items that belong to the current lowest plant group and only those items that were created by the current user of SmartPlant Instrumentation. You can use these two filtering options on their own or in concurrence with another filter definition.

Filter settings take effect only for the user who defined the filter and only for the current custom view of the active **Explorer** window.

Note that item type filters override your item name filters.

For more information, see *Filter the Display of Items According to a Specific Item Type* (on page 544).

Filter the Display of Items According to a Specific Item Name

This option allows you to filter the items according to a specific item name. An item name filter affects the entire tree view of the current view of the active **Explorer** window and not just a particular folder or hierarchy node. You can also instruct the software to override the item type filters if needed.

Also, you can filter the items so that the software displays only those items that belong to the current lowest plant group and only those items that were created by the current user of SmartPlant Instrumentation. You can use these two filtering options on their own or in concurrence with another filter definition.

You can define an item name filter only if you do one of the following:

- Without selecting anything in the **Explorer** window, click  on the toolbar.
- Right-click the root node in the **Explorer** tree view and then on the shortcut menu, click **Filter**.

Note that filter settings take effect only for the user who defined the filter and only for the current custom view of the active **Explorer** window. For more information, see *Filter the Display of Items According to a Specific Item Name* (on page 544).

Filter Cables in an Explorer Window

Allows you to set additional filter definitions for the **Cables** and the **Cross Cables** folders. You can filter cables according to their connections and cables that are connected to a specific Foundation Fieldbus or Profibus segment. For more information, see *Filter Cables in an Explorer Window* (on page 545).

Filter Loops in an Explorer Window

Allows you to set additional filter definitions for the **Loops** folder. You can filter loops according to blocks associated with loop tags. For more information, see *Filter Loops in an Explorer Window* (on page 546).

Use My List in the Items Pane

This procedure explains how to add various items to the **My List** view of the **Items** pane. **My List** allows you to create a special view of the **Items** pane where you can keep items that belong to various folders in the tree view. The software retains all the items in the **My List** view until you remove them from that list. Exiting SmartPlant Instrumentation and starting a new session does not affect the contents of **My List**. For more information, see *Add Items to My List in the Items Pane* (on page 548).

Display a Browser View in the Explorer Items Pane

This option allows you to display a browser view in the **Items** pane for an item type or a folder that you select in the **Reference Explorer** tree view. This way, instead of displaying child items, you can display item properties of the item you selected in the tree view pane. The software displays the browser view according to the style settings of the selected browser. You can print out the current browser view, however, you cannot edit the item properties. For more information, see *Display a Browser View in the Explorer Items Pane* (on page 547).

Define and Use a Custom View

SmartPlant Instrumentation allows you to define custom views for the **Domain Explorer** and the **Reference Explorer**. The software lets you select a folder or multiple folders and add these folders with their child items to a custom view that you select. Note that the custom views that you define are not available to other users of SmartPlant Instrumentation. For more information, see *Define and Use a Custom View* (on page 548).

The Organization of Items in the Reference Explorer Tree View

The tree view pane of the **Reference Explorer** shows reference items organized by folders. SmartPlant Instrumentation defines standard folders in the database. You cannot move or delete these folders, nor can you add new folders. Each folder contains a particular item type, and the options available on the menus depend on the currently selected item type.

Panels

In this folder, reference panels are arranged according to their category. Panels, in turn, contain their child items, for example terminal strips, racks, wiring equipment, and so forth. There is a lot of flexibility in creating a panel hierarchy. There is no rigid structure like "panel - strip - terminal" that limits your wiring design. You can create various wiring structures, as you require. For details, see *Panels by Category Hierarchy Examples* (on page 529) to examine a few possible structures.

Cables

This folder holds all the existing reference cables. You can create various child items under cables. For an example, see *Cable Hierarchy Example* (on page 531).

Wiring Equipment

This folder holds all the available reference wiring equipment. The items are organized in sub-folders according to the wiring equipment category such as barriers, amplifiers, hubs, I/O cards, and so forth.

Hook-Up Item Libraries

This folder enables you to create and manage hook-up libraries and sub-libraries, and organize hook-up items in sub-libraries as you require. For details, see *Items in the Hook-Up Item Libraries Folder* (on page 555).

Items in the Hook-Up Item Libraries Folder

The **Hook-Up Item Libraries** folder of the **Reference Explorer** enables you to navigate to a hook-up item library, hook-up item sub-library, or hook-up item in a graphical way resembling the Windows Explorer. You can expand or collapse the levels to view the existing items. The **Hook-Up Item Libraries** folder shows you at a glance the graphical representation of the relationships that exist among the hook-up item libraries, hook-up item sub-libraries, and hook-up items.

The **Reference Explorer** employs an expandable/collapsible hierarchy that allows you to navigate to relevant items and select them for use. To perform an action, right-click the **Hook-Up Item Libraries** folder or an item and then click a command. Note that the software uses various icons beside a folder or item to indicate the status of a folder or an item, for example a view-only item, a claimed item, an item that belongs to As-Built, and so forth. For the full list of the item indicators, see *Item Status Indicators in the Domain Explorer* (on page 540). For a detailed explanation of the tree view and **Items** panes, see *Working with the Reference Explorer*.

In the **Hook-Up Item Libraries** folder, the software arranges the items in three levels, based on the relationship among them.

Level 1: Hook-Up Item Libraries

This is the highest level in the **Hook-Up Item Libraries** folder hierarchy. At this level, the software displays all the hook-up libraries that exist in the current domain. Hook-up libraries are indicated with the  icon.

A hook-up library always contains one default sub-library and can also contain any number of user-defined sub-libraries. For each hook-up library, on the shortcut menu, you can click **New** to add user-defined sub-libraries, or click **Properties** to update properties of an existing sub-library. You must set a specific library as the active item library, which is indicated with the  icon. To do so, on the shortcut menu, click **Actions > Set as Active Item Library**. You cannot delete the default sub-library.

Level 2: Hook-Up Item Sub-Libraries

Hook-up sub-libraries (indicated with the  icon) appear under hook-up libraries. At this level, you can click **New** to add items to sub-libraries, or click **Properties** to update properties of an existing sub-library. You cannot delete the default sub-library.

Level 3: Hook-Up Items

Hook-up items (indicated with the  icon) appear under hook-up item sub-libraries. Hook-up items do not contain child items. The actions that you can perform at this level depend on the sub-library to which the items belong.

In the default sub-library, you can perform the following actions:

- Add new hook-up items one by one or in batch mode. To add a single item, right-click the default sub-library and on the shortcut menu, click **New**. To add items in batch mode, on the shortcut menu, click **Actions > Batch Item Creation**.
- Update properties of an existing item. If this item exists in the user-defined sub-libraries, the software automatically updates the item properties in the user-defined sub-libraries.
- Permanently delete a hook-up item. When deleting an item from the default sub-library, the software also deletes this item from all of the sub-libraries that exist in the entire item library.
- Manually associate an item with a user-defined sub-library by dragging the item from the default sub-library to a user-defined sub-library.

In a user-defined sub-library, you can perform the following actions:

- Add new hook-up items. When you create a new item in a user-defined sub-library, the software automatically creates this item in the default sub-library too.
- Update properties of an existing item. When you update properties of an item in a user-defined sub-library, the software automatically updates the item properties in the default sub-library too. You can only add new hook-up items that do not exist in the default sub-library.
- Associate hook-up items with sub-libraries or remove items from sub-libraries. To do so, select and right-click a user-defined sub-library and then, on the shortcut menu, click **Actions > Associate Items with Sub-Libraries**.
- Associate pipe specs with sub-libraries. To do so, select and right-click a user-defined sub-library and then, on the shortcut menu, click **Actions > Associate Pipe Specs with Sub-Libraries**. For more information on implementation of pipe specs in SmartPlant Instrumentation, see *Pipe Specs: An Overview* (see "Pipe Specs" on page 309).

Create a Reference Item

1. Press F8 to open the **Reference Explorer**.
2. Double-click a folder to display the other existing folders or items.
TIP If a folder does not contain sub-folders, right-click the main folder.
3. Right-click a sub-folder and then on the shortcut menu, click **New** and then click a menu command.

NOTE The software does not check for duplicate names when creating a reference I/O card. This is so because I/O card uniqueness is based on a parent item and there are no parent items for I/O cards in the **Reference Explorer**.

Create a Reference I/O Card

1. Press F8 to open the **Reference Explorer** and expand the **Panels** folder.
2. In the **Reference Explorer**, expand the **Wiring Equipment** folder.
3. Right-click the **I/O Cards** folder and then on the shortcut menu, click **New > Wiring Equipment**.
4. In the **New Wiring Equipment** dialog box, under **Name**, type the name of the new I/O card and click **OK**.
TIP As a rule, I/O cards reside in rack slots. However, reference I/O cards do not have parent hierarchy items. As a result, the software does not check the name uniqueness of new reference I/O cards. Therefore, make sure that you name your new reference I/O cards appropriately.
5. On the **Wiring Equipment Properties – I/O Card** dialog box, on the **General** tab, do one of the following to define the name of the new card:
 - Select the **Apply naming convention** check box selected if you want the software to name the new card automatically according to the naming conventions that are set for this type of equipment in the Administration module. For more information, see SmartPlant Instrumentation Administration Help, *Domain Administration > Naming Conventions*.
 - Clear the **Apply naming convention** check box and under **Name**, type the name of the new card. Note that if you do not clear the **Apply naming convention** check box, the software will ignore the name that you type under **Name**.
6. Select the **Double width** check box if the card occupies a double width slot.
7. In the **Details** group box do the following as you require:

- a. Type a description.
 - b. Select an I/O card type, model, and manufacturer. If the required value is not available on the list, click  to define a new one.
 - c. Enter a sequence if you need to define the sequence of the new card in its parent item. This sequence also determines the order in which wiring items appear under their parent item in the **Domain Explorer** tree view.
8. Click the **Control System** tab.
 9. In the **Control system details** group box, under **I/O type**, select a I/O type to determine the actual function of the new I/O card. For example, **AI**, **AO**, **DI**, **DP**, **Fieldbus**, **Profibus**, and so forth. You can add more values to this list in the **I/O Type** supporting table in the Instrument Index module. (See the important notes at the end of this procedure.)
 10. Under **Module**, type the software address that this card is assigned to.
TIP **Module**, **Controller/ Processor**, **Rack**, and **Slot** are field headers specific to panel manufacturers. Selecting a different manufacturer when editing the panel displays the headings used by that panel manufacturer. For details, see *Customize the Controller/Processor List Header in I/O Card Properties*.
 11. From the **Controller/Processor** list, select an I/O card controller. If the required controller is not available on the list, click  to define a new one.
 12. To view the list of all I/O terminations associated with the current I/O card, click the **I/O Terminations** button.
 13. Click the **Category Properties** tab.
 14. Revise and modify category property values as you require. Click the value for each property and modify it as needed.
TIP **I/O card** is a wiring equipment category that is shipped with SmartPlant Instrumentation. You cannot delete or rename any of the wiring equipment categories that have been shipped with the software. Nor can you delete or rename the properties of the shipped categories. However, when editing I/O card properties, you can add user-defined properties which you can rename or delete as you wish. For details, see *Customize and Use Wiring Equipment Categories*.
 15. Click the **Associate Symbols** tab to associate a symbol with the current I/O cards. The software will use this symbol when generating a report in the Enhanced Report Utility. For details, see *Associate a Symbol with an Item*.
 16. Click **OK** to accept your settings and close the dialog box.

IMPORTANT

- In a redundant system configuration, an I/O card can function as a primary or secondary I/O card and can be associated with several I/O terminations. Therefore, an I/O termination can serve multi-paired redundant I/O cards. However, in these redundant I/O card configurations, the I/O termination can be associated only with one pair of primary and secondary I/O cards. Also, an I/O card cannot function as both a primary and secondary I/O card for the same I/O termination.
- If an I/O card functions as a primary I/O card, the **Control System** tab of the **Wiring Equipment Properties – I/O Card** dialog box displays the secondary I/O card data and the primary I/O card data properties remain blank. If an I/O card functions as a secondary I/O card, the **Control System** tab displays the primary I/O card data and the secondary I/O card data properties remain blank.

Create a Reference Wiring Equipment Item

1. Press F8 to open the **Reference Explorer**.
2. In the **Reference Explorer**, expand the **Wiring Equipment** folder.
3. Right-click an appropriate child folder and then on the shortcut menu, click **New > Wiring Equipment**.
TIP Since reference wiring equipment items do not have parent hierarchy items, the software does not check the name uniqueness of new reference wiring equipment items. Therefore, make sure that you name your new reference items appropriately.
4. On the **New Wiring Equipment** dialog box, under **Name**, type the name of the item and click **OK**.
5. On the **Wiring Equipment Properties** dialog box, on the **General** tab, do one of the following to define the name of the new equipment:
 - Select the **Apply naming convention** check box selected if you want the software to name the new equipment automatically according to the naming conventions that are set for this type of equipment in the Administration module. For more information, see SmartPlant Instrumentation Administration Help, Domain Administration > Naming Conventions.
 - Clear the **Apply naming convention** check box and under **Name**, type the name of the new equipment. Note that if you do not clear the **Apply naming convention** check box, the software will ignore the name that you type under **Name**.
6. Select the **Double width** check box if the item occupies a double width slot.
7. In the **Details** group box do the following as you require:
 - Type a description.
 - Select an item type, model, and manufacturer. If the required value is not available on the list, click  to define a new one.
 - Enter a sequence if you need to define the sequence of the new item in its parent item. This sequence also determines the order in which wiring items appear under their parent item in the **Domain Explorer** tree view.
8. Click the **Category Properties** tab.
TIP If you are creating a miscellaneous wiring equipment item, the **Category Properties** tab is not available.
9. Revise and modify category property values as you require. Click the value for each property and modify it as needed.
TIP Wiring equipment categories that are shipped with SmartPlant Instrumentation have predefined properties. You cannot delete or rename any of these categories or their properties. You can only edit their values. However, you can add user-defined properties to any category which you can rename or delete as you wish. For details, see *Customize and Use Wiring Equipment Categories*.
10. Click the **Associate Symbols** tab to associate a symbol with the current item. The software will use this symbol when generating a report in the Enhanced Report Utility. For details, see *Associate a Symbol with an Item*.
11. Click **OK** to accept your settings and close the dialog box.

Create a Reference I/O Termination

1. Press F8 to open the **Reference Explorer**.

2. In the **Reference Explorer**, expand the **Wiring Equipment** folder.
3. Right-click the **I/O Terminations** folder and then on the shortcut menu, click **New > Wiring Equipment**.

TIP Since reference I/O termination items do not have parent hierarchy items, the software does not check the name uniqueness of new reference I/O termination items. Therefore, make sure that you name your new reference I/O termination items appropriately.
4. On the **New Wiring Equipment** dialog box, from the **Category** list, select **I/O Termination**.
5. Under **Name**, type the name of the new I/O termination and click **OK**.
6. On the **Wiring Equipment Properties – I/O Termination** dialog box, on the **General** tab, do one of the following to define the name of the new card:
 - Select the **Apply naming convention** check box selected if you want the software to name the new card automatically according to the naming conventions that are set for this type of equipment in the Administration module. For more information, see SmartPlant Instrumentation Administration Help, Domain *Administration* > Naming Conventions.
 - Clear the **Apply naming convention** check box and under **Name**, type the name of the new card. Note that if you do not clear the **Apply naming convention** check box, the software will ignore the name that you type under **Name**.
7. Select the **Double width** check box if the card occupies a double width slot.
8. In the **Details** group box do the following as you require:
9. Type a description.
 - a. Select an I/O termination type, model, and manufacturer. If the required value is not available on the list, click  to define a new one.
 - b. Enter a sequence if you need to define the sequence of the new I/O termination in its parent item. This sequence also determines the order in which wiring items appear under their parent item in the **Domain Explorer** tree view.
10. Click the **Control System** tab.
11. From the **I/O type** list, select a I/O type to determine the actual function of the new I/O termination. For example, **AI**, **AO**, **DI**, **DP**, **Fieldbus**, **Profibus**, and so forth. You can add more values to this list in the **I/O Type** supporting table in the Instrument Index module.
12. To set the new I/O termination in a distant cabinet or to associate the I/O termination with an I/O card that resides in another panel, do the following:
 - a. Select the **Set within a distant cabinet** check box.
 - b. Select a cabinet in the **Primary I/O card** group box.
13. To associate the current I/O termination with an I/O card that does not have a built-in termination block, select the required options in the **Primary I/O card** group box.

TIP The **I/O card** list contains only those I/O cards that have been created under a rack and a slot. For more information, see Associate an I/O card with an I/O Termination.
14. To define the current I/O termination as an I/O termination that serves two redundant I/O cards, do the following:
 - a. Select the **Define a redundant I/O card** check box.
 - b. Select the required options in the **Secondary I/O card** group box.
 - c. Click the **Category Properties** tab.
 - d. Revise and modify category property values as you require. Click the value for each property and modify it as needed.

TIP **I/O termination** is a wiring equipment category that is shipped with SmartPlant Instrumentation. You cannot delete or rename any of the wiring equipment categories that have been shipped with the software. Nor can you delete or rename the properties of the shipped categories. However, when editing I/O termination properties, you can add user-defined properties which you can rename or delete as you wish. For details, see *Customize and Use Wiring Equipment Categories*.

- e. Click the **Associate Symbols** tab to associate a symbol with the current I/O termination. The software will use this symbol when generating a report in the Enhanced Report Utility. For details, see *Associate a Symbol with an Item*.
- f. Click **OK** to accept your settings and close the dialog box.

Copy a Reference Item to the Domain Explorer

1. Press F7 and then F8 to open the **Domain Explorer** and the **Reference Explorer**.
2. In the **Reference Explorer**, expand a hierarchy level and select a reference item.
3. Drag your selection to a destination level in the **Domain Explorer**. Place both **Explorer** windows side by side on your screen and then drag the required items from one **Explorer** to the other.
4. In the appropriate properties dialog box, (depending on the reference item that you are copying), modify the properties of the new item as you require.

Browser Views and Browser Manager

The Browser module provides you with a wide-angle view of your instrument index data and allows you to browse through and modify it from a single location in SmartPlant Instrumentation.

The core of the Browser module is the **Browser Manager** that contains a number of predefined browsers categorized by data type. Each browser is associated with a particular SmartPlant Instrumentation module but in some cases, it is possible to present data from several different modules in a single browser view. In addition to the predefined browsers, you can also create custom browsers such as specification form browsers and PowerSoft browsers. The browsers are grouped according to their category. Such a group is referred to as a browser group. For example, by defining a browser view for the **Control Valve** browser in the **Process Data & Calculation** group, you can display information for all instrument tags which have the same process function, for example, flow meters.

You access and manipulate module data and various items by creating customized browser views for each of the predefined and custom browsers in the **Browser Manager**. You customize each browser view by defining its style, sorting sequence, and filter. You can define a number of different browser views for each browser to organize your data according to different requirements. Each browser view will have its own style settings, sorting sequence, and filter to present your instrument index data in the most efficient and informative manner. The browser view style settings determine which columns and items will be displayed. The sorting sequence organizes the selected fields in a particular order and the filter lets you display the data filtered according to the condition you define.

In addition to the database fields provided to you by default, the **Browser Manager** also allows you to display custom fields, which you can use to complement data attributes not supported by the given database fields in a particular module. You can modify the names of custom fields, as you desire. Depending on your SmartPlant Instrumentation license, you can also import browser views into SmartPlant Instrumentation. The views are available as add-ons, and once added you can use them to access the required data.

NOTE For some browser views, the **Browser Manager** allows you to compare two report revisions or compare the currently previewed report with a report revision. This option is available only for some browser viewers for which this functionality exists and if the **Mark Changes and History** options have not been selected.

SECTION 39

Browser Manager

The **Browser Manager** enables you to define the settings for the **Browser View** window that displays your project data. You select your data and determine how the software displays it in the **Browser View** window. You define your viewing settings by defining a view for a selected Browser that is associated with a particular SmartPlant Instrumentation module. Once you define and then select a view for a particular browser, the **Browser View** window displays your data according to the selected view settings. You define a view by either creating a new view or duplicating an existing one.

The first step in defining view settings, is to create a browser view profile (viewing template) for a browser that you select from the **Browser groups** list. Each browser view must be based on a view profile that is defined before any other settings can be selected. A browser view can contain style, sorting sequence, and filter settings:

- **Style** — Allows you to select the fields to be displayed, define the field layout (that is, the order in which these fields will be displayed), define the data field headers which will be used for the current style, and set the field length (number of characters) which will be displayed for each selected field.
- **Sort** — Allows you to determine the sorting sequence of the fields in the **Browser View** window. You can also select a different sorting sequence when viewing the data in the **Browser View** window.
- **Filter** — Allows you to set a filtering condition that is used to filter the selected data rows displayed in the **Browser View** window. The filter conditions that you apply determine the scope of data that is published from browsers.

After you have defined all the view settings that you require, you can open the **Browser View** window, where the current settings are applied to the data with which the selected browser is associated.

Browser Manager Hierarchy

You define the viewing settings for a specific browser hierarchy level as shown below (the following example is the hierarchy which is displayed in the **Browser Manager Browser Groups** data window).

The **Browser Groups** hierarchy is as follows:

First level — Browser Group	 Instrument Index
Second level — Browser	 Calibration Settings Browser
Third level — View	 New Calibration Settings
Fourth level — View Settings	 Style  Sort  Filter

- **Browser Group** — The first level of the hierarchy stands for a **Browser Group** which represents a module or an item category (for example, Control System). Each group can contain one or more browsers.

- **Browser** — Each browser is associated with the data of a particular module (for example, **Loop** and **Equipment** in the instrument Index module or an item type whose data it displays. A browser contains one or more viewing templates or views that you can select and modify to customize the way the corresponding data is displayed in the **Browser View** window.

NOTE You cannot add or delete any browser group or browser, nor can you change their names. You can only delete a custom browser.

- **View** — Each view (a viewing template) contains the viewing settings: viewing style, sorting order, and filtering condition. These settings will be used to display the data that the selected view is associated with. You can add, delete, modify, or duplicate the view profile to customize the way the data is displayed in the **Browser View** window.

Browser Manager Common Tasks

The following tasks are used frequently when working with the **Browser Manager**.

Select a Default Browser

This procedure shows you how to define a default browser in the **Browser Manager**. This enables you to open the default browser view whenever starting SmartPlant Instrumentation with the Browser module. If other modules are open, the default browser option is disabled. For more information, see *Select a Default Browser* (on page 565).

Define a View Profile

This option shows you how to define a view profile, the first step in creating a browser view. A browser view profile serves as a basis for a browser view. After creating a view profile, you can define style, sort, and filter settings for the selected browser view. Once you have defined all the view settings, you can open the view and work with the available data. For more information, see *Define a View Profile* (on page 565).

Add a New View

This option shows you how to add a new view to an existing browser, enabling you to create a customized display of your data. SmartPlant Instrumentation displays your data in the **Browser View** window according to the style, sort, and filter settings you chose. You start by defining a view profile. Then, you define the required style, sort, and filter settings for the new view. Note that you can also duplicate an existing view and then modify some of the settings as required. For more information, see *Add a New View* (on page 566).

Duplicate a View

This procedure shows you how to duplicate an existing view. Creating several different views for the same browser can be very useful when you need to work with the same module data organized in a different manner. Duplicating an existing view within the same browser is a fast way to create a new view on the fly. After duplicating a view, you can modify it as needed. For more information, see *Duplicate a View* (on page 567).

Copy a View to Another Plant

This procedure shows you how to copy a view from one <plant> to another within the same SmartPlant Instrumentation domain. When copying view settings, the software copies style, sort, and filter settings defined in the source view. For more information, see *Copy a View to Another Plant* (on page 567).

Modify a View Profile

This option shows you how to modify the profile of an existing browser view. This can be necessary after duplicating a browser view. For more information, see *Modify a View Profile* (on page 568).

Delete a View

This option shows you how to delete a browser view that is no longer required. Remember that when deleting a browser view you also delete its **Style**, **Sort** and **Filter** settings. For more information, see *Delete a View* (on page 568).

Find a Browser or Browser View

This option shows you how to find a browser or browser view in the Browser Manager. For more information, see *Find a Browser or Browser View* (on page 569).

Select a Default Browser

1. Open the **Browser Manager** and expand the required **Browser Group** to display its browsers.
2. Highlight the required browser view, and click **Edit**.
3. Select the **Set as default view** check box.
4. Right-click the browser which you want to set as default and then, on the shortcut menu, click **Set As Default**.

IMPORTANT

- The default browser that you select must have a default view. For details, see *Add a New View* (on page 566).

Define a View Profile

1. Open the **Browser Manager** and expand the required browser group to display its browsers.
2. Select the browser to which you want to add a view and do one of the following:
 - Click **Actions > Add View**.
 - Right-click the highlighted browser and then, on the shortcut menu, click **Add View**.
 - Click .
3. In the **View Name** field, type the name of the new browser view that you are creating.
4. In the **View Description** field, type a brief description of the new browser view.
5. From the **Display data at level** list, to set the level on which to display the data in the **Browser View** window. You can select any of the hierarchy levels that you defined for the domain, for example, <Plant>, <Area>, <Unit>, or the level of the domain itself.

TIPS

- For an Instrument Index Standard Browser or Tag Number Browser, you can also select **Typical** to create a browser view profile with only typical tag and typical loop data.
- For an Instrument Type browser, you can create a browser view profile on the domain level only.
- Select the **Set as default** check box to make the current view the default view for the browser to which this view belongs. This way, all the settings defined for this view will be used to display the data in all the views belonging to the current browser.

- Selecting this option allows you to switch between plants in a given domain and define a default browser view for another plant, while retaining the default browser views that were previously defined for plants in the current domain. By not selecting the **Set as default view** check box, your default browser view is not retained when defining a new default browser view in a different plant.
6. Select the **Count per group** check box to display in the print preview and the printed view, the total number of rows contained in each group, delimited by the group separator in the print preview.
 7. Select the **Personal view** check box to make this view available to the current user only. Other users will not be able to see this view under **Browser Groups** and therefore will not be able to open it.
 8. Click **Save**.
 9. Define the style settings you require. For more details, see *Style Settings*.
 10. Define the sort settings you require. For more details, see *Sort Settings*.
 11. Define the filter settings you require. For more details, see *View Filter Settings*.
 12. Select another browser to define a **View profile**, or close the **Browser Manager**.

Add a New View

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. In the **Browser Manager**, highlight the required browser in the **Browser Groups** data window. For more information on how the browsers are organized, see *Browser Manager Hierarchy* (on page 563).
4. Define a view profile for the new browser view. For more information, see *Define a View Profile* (on page 565).
5. Define the style settings. For more details, see *Create a View Style* (on page 593).
6. Set a sorting sequence. For more details, see *Create a Sorting Sequence View* (on page 602).
7. Define a filtering condition if needed. For more details, see *Define a View Filter* (on page 609).
8. Click  to open the new browser view.

Duplicate a View

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. In the **Browser Manager**, highlight the required browser in the **Browser groups** data window. For more information on how the browsers are organized, see *Browser Manager Hierarchy* (on page 563).
4. Do one of the following:
 - To duplicate all the view settings, highlight the view that you want to duplicate.
 - To duplicate only a selected view setting, expand the view and select the **Style**, **Sort** or **Filter** icon as required.
5. Do one of the following:
 - Click .
 - Click **Actions > Copy**.
 - Right-click the view you want to copy and then, on the shortcut menu, click **Copy**.
6. Select the target browser and do one of the following:
 - Click .
 - Click **Actions > Paste**.
 - Right-click the target browser and then, on the shortcut menu, click **Paste**.

NOTES

- You can duplicate the view with all its settings or only with the setting (**view**, **sort**, or **filter**) that you select.
- You can duplicate browser views only if they belong to the same browser.
- If you close the Browser Manager, the item you copied will be lost.

Copy a View to Another Plant

1. On the **Browser Manager**, select a view that you want to copy to another plant.
2. Do one of the following:
 - Right-click, and from the shortcut menu select **Copy to Other Plant**.
 - Click **Actions > Copy to Other Plants**.
3. On the **Copy View Settings** dialog box, select a plant, and then click **Copy**.

NOTE If the same view name already exists in the target plant browser, the software does not overwrite the settings of the target view, but creates another view with the same name.

Modify a View Profile

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. In the **Browser Manager**, highlight the required browser in the **Browser groups** data window. For more information on how the browsers are organized, see *Browser Manager Hierarchy* (on page 563).
4. Click **Edit**.
5. Modify the current view profile settings, by doing any of the following:
 - In the **View name** field — modify the name of the browser view.
 - In the **View description** field — add or change a brief description of the browser view.
 - From the **Display data at level** list — change the level on which to display the data in the **Browser View** window.
 - In the **Set as default** check box — select to make the current view the default view for the browser, or clear the check box so the current view is not the default view for the browser.
 - In the **Count per group** check box — select to display in the print preview and the printed view, the total number of rows contained in each group delimited by the group separator in the print preview, or clear the check box so this option will not work.
 - In the **Select the Personal view** check box — select to make this view available to the current user only, or clear the check box so this option will not work.
6. Click **Save**, to save the view profile with the settings you have just entered.

Delete a View

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. In the **Browser Manager**, select the target browser in the **Browser groups** data window.
4. In the **Browser groups** data window, select the view you want to delete.
5. Click **Style**.
6. Do one of the following:
 - If the **Enable current view in SmartPlant Explorer and in the Find Documents to Publish** is not enabled, proceed to the next step.
 - In the **Style** pane, if the **Enable current view in SmartPlant Explorer and in the Find Documents to Publish** is enabled do the following:
 - i. In the Domain Explorer, select an appropriate folder.
 - ii. Right-click, and from the shortcut menu select **Show Browser**.

- iii. In the **Show Browser** dialog box, make sure the **Browser View** you want to delete is not displayed and click **OK**.
 - iv. On the **Style** pane, click **Edit**.
 - v. Clear the **Enable current view in SmartPlant Explorer and in the Find Documents to Publish** check box.
 - vi. Click **Save**.
7. Do one of the following:
 - Click .
 - Click **Actions > Delete**.
 - Right-click and on the shortcut menu select **Delete**.

Find a Browser or Browser View

1. In the **Browser Manager**, do one of the following:
 - Click .
 - On the menu bar, click **Actions > Find**.
2. Select the **Browser** or **View** option button, depending on what you want to find.
3. In the data field, type the value that you want to find.
4. To match the retrieved values with the value you are searching for, do one of the following:
 - Select **Whole Value** to find only occurrences that are whole words (this is the default selection).
 - Select **String** to find occurrences that are either whole words or part of a word.
5. Click **Find**.

TIPS
 - During the search, the **Find** button changes to **Stop**, allowing you to stop the search, if required.
 - When an appropriate occurrence is found, the corresponding row is automatically selected.
6. Click **Find** to find the next occurrence.
7. Click **Close** when finished.

Browser Groups

The following browser groups are available in the **Browser Manager**. It is not possible to add new groups.

- *Instrument Index Browser Group* (on page 570)
- *Process Data and Calculation Browser Group* (on page 572)
- *Specifications Browser Group* (on page 573)
- *Wiring Browser Group* (on page 574)
- *Hook-Ups Browser Group* (on page 575)
- *Loop Drawings Browser Group* (on page 575)
- *Control System Browser Group* (on page 575)
- *Dimensional Data Browser Group* (on page 576)
- *Construction and Commissioning Browser Group* (on page 577)
- *Document Binder Browser Group* (on page 578)
- *Documents Browser Group* (on page 578)

- *General Browser Group* (on page 579)
- *Telecom Browser Group* (on page 579)

Instrument Index Browser Group

The following table lists all the available browsers, and their descriptions, within the **Instrument Index** browser group.

Browser	Description
Calibration Results Browser	Displays instruments and their attributes that include instrument calibration results. After filtering the fields, create a calibration result analysis for a certain period, an instrument calibration list, and so forth. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
Calibration Settings Browser	Displays calibration settings (ranges, set points, alarm points, and so forth) for a selected instruments. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
Circuit Related Electrical Tag Browser	Displays data for tag numbers derived from SmartPlant Electrical signals for circuits. If a circuit relates to more than one electrical item, a separate data row appears for each item. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
DDP and Index Browser	Displays instruments and their associated dimensional data for piping. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
Drawing Summary Browser	Allows you to generate a document list for selected instruments. A document list may include specifications, process data sheets, loop and hook-up drawings. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
Electrical Power Element Browser	Displays electrical properties owned by SmartPlant Instrumentation and SmartPlant Electrical for instruments and cabinets. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
Electrical Tag Browser	Displays data for all tag numbers derived from SmartPlant Electrical signals for all items but does not retrieve data values of associated attributes for signals created under circuits. The software displays data for the main item and also associated circuit data.(Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
Equipment Browser	Process equipment list for the current plant, area, or unit.
Fieldbus Tag Number List Browser	Displays fieldbus instruments and their associated segments. You can create browser views to be used in the Fieldbus Tag Numbers browser to associate tags with segments. (Can be utilized when filtering I/O assignment data

Browser	Description
	in the I/O Assignment Filter dialog box.)
Function Requirement Browser	Displays existing function requirement tag numbers and their properties. The browser allows you to view and edit the data. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
Instrument Connection Pre-assignment Browser	Allows you to pre-assign specific panels to selected device panels. This pre- assignment facilitates faster and more efficient wiring design. The purpose of this pre-assignment is to enable you to define an auto-wiring task for the pre-assigned panels as well as providing a criterion by which to filter the cables so that only pre- assigned device cables are displayed for connection with panels. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
Instrument Connection Pre-assignment (Advanced) Browser	In addition to the options available for the Instrument Connection Pre-assignment Browser, you can also display the Control System Tag data in the browser view. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
Instrument Index Standard Browser	Allows you to display and edit tag numbers from the Instrument Index module. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
Instrument Type Browser	Displays a list of instrument types and their default profiles. This browser is especially useful when you need to define a default profile for numerous instrument types at the start of a project design. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
JB – Index Browser	Displays existing field devices and their connections to junction boxes and terminals. Note that you can view only those field devices that are connected to the junction box whose wiring is continued from the other side of the terminal. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
Line Browser	Lists existing lines and their properties (except for process data), and allows you to edit the properties.
Loop Browser	Lists existing loop numbers and their properties, and allows you to edit the properties. This browser does not show associated tag numbers. In the Loop Browser view, you can select a P&ID drawing number from the P&ID list and have this drawing number propagated to all instruments associated with a particular loop. After saving the settings, the new P&ID appears selected in both the Loop Browser View window in the Browser module and on the Tag Number Properties dialog box in the Instrument Index module. Before using this feature, make sure that in the Instrument Index module, on the Loop Number Properties dialog box, the Apply P&ID drawing to tags check box is selected.

Browser	Description
Maintenance Schedule Browser	Lists existing instruments for which work requests or repair forms have been issued. Also, displays the instruments for which preventive maintenance has been scheduled. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
Range Browser	Displays the following range values: calibration range, process data range, alarm and trip settings. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
Tag Category Browser	Displays existing instrument tag numbers that have been associated with a tag category. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
Tag Number Browser	Lists existing instrument tag numbers and their properties, and allows you to edit the properties. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)

Process Data and Calculation Browser Group

The following table lists all the available browsers, and their descriptions, within the **Process Data and Calculation** browser group.

TIP All the browsers in this group can be used to filter I/O assignment data in the **I/O Assignment** window.

Browser	Description
Analyzer Browser	Lists the existing analyzers, and allows you to edit the associated data. You can also include custom fields.
Control Valve Browser	Lists the existing control valves for process and calculation data, and allows you to edit the control valve properties. You can also include custom fields.
Flow Instrument Browser	Lists the existing flow instruments for process and calculation data, and allows you to edit the flow instrument properties. You can also include custom fields.
General Process Browser	Lists all the General Process Data field records, tag number custom field data, as well as specification and process data custom field information.
Level Instrument Browser	Lists the existing level instruments for process data, and allows you to edit the level instrument properties. You can also include custom fields.
Line Component Browser	Lists existing line measuring components for analyzers and allows you to edit the components.
Line Process Data Browser	Lists the line data for process data and calculation, and allows you to edit the line data. You can also include line custom field data.

Browser	Description
Pressure Instrument Browser	Lists the existing pressure instruments for process data, and allows you to edit the pressure instrument properties. You can also include custom fields.
Relief Valve Browser	Lists the existing relief valves for process data and calculation, and allows you to edit the relief valve properties. You can also include custom fields.
Temperature Instrument Browser	Lists the existing temperature instruments for process data and calculation, and allows you to edit the temperature instrument properties. You can also include custom fields.

Specifications Browser Group

The following table lists all the browsers that you can add within the **Specifications** browser group.

Browser	Description
Specifications Browser	Lists specifications and allows you to edit them. You can also include drawing custom field data. This browser comes shipped with SmartPlant Instrumentation. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
Single-Form Browser	A custom browser whose format you generate and save in the Spec Data Dictionary of the Specifications module. You add such single-form browsers to the Specifications browser group using the Browser Manager > Browser > Form Browser option. The browser name is user-defined.
Multi-Form Browser	A custom browser that allows you to display field headers and the values of field that are assigned to these headers in different specification forms. You generate such browsers using the Multi-Form Browser Wizard of the Specifications module. The software adds multi-form browsers automatically to the Specifications browser group. The names of multi-form browsers always start with the Multi-Form.

Wiring Browser Group

The following table lists all the available browsers, and their descriptions, within the **Wiring** browser group.

Browser	Description
Auto-Wiring Routing Task Browser	Allows you to define and execute auto-wiring tasks for selected junction boxes and control system panels.
Cable Browser	Lists all the available cables and their attributes.
Cable Set Browser	Displays all the cable sets in the existing cables and allows you to edit the cable sets. Only the cable set data can be edited.
Device Panel Browser	Displays field devices and their connections. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
General Panel Browser	Displays existing panel data and allows you to edit the data. (Can be utilized when filtering device panels.)
I/O Card Browser	Displays I/O card data and allows you to edit the data. This browser also includes I/O card custom fields. (Can be utilized when filtering device panels.)
I/O Terminal Browser	Displays I/O terminal data and allows you to edit the data. You can also view the panels and I/O cards to which the terminals belong. (Can be utilized when filtering device panels.)
Local Signal Browser	Displays the existing local signals.
Rack Browser	Displays the existing hardware racks and allows you to edit them.(Can be utilized when filtering device panels.)
Segment Assignment	Allows you to select a segment to be associated with a displayed home-run cable and terminator. (Can be utilized when filtering device panels.)
Slot Browser	Displays existing slot data and allows you to edit the data.
Strip Browser	Displays all the existing terminals and allows you to edit them. You can also view the appropriate strips and panels. (Can be utilized when filtering device panels.)
Telecom Channel Data Browser	Displays channel data for telecom objects and allows you to edit the data.
Terminal Browser	Displays the existing terminals and allows you to edit them. (Can be utilized when filtering device panels.)
Terminal Connection Browser	Displays terminal connection data. The data includes the connection on both sides of the terminals. (Can be utilized when filtering device panels.)
Wire Browser	Displays wire data and also displays the cable sets and cables to which the wires belong. You can edit the wire data as you require.
Wire Connection Browser	Displays wire connection data. The data includes the connection on both sides of the wires.

Browser	Description
Wiring Equipment Browser	Displays existing wiring equipment data and allows you to edit the data.

Hook-Ups Browser Group

The following table lists all the available browsers, and their descriptions, within the **Hook-Ups** browser group.

Browser	Description
Hook-Up Browser	Display and edit the existing hook-up types, and the associated hook-ups. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
Item List Browser	Lists all the items from the hook-up library.

Loop Drawings Browser Group

The following table lists all the available browsers, and their descriptions, within the **Loop Drawings** browser group.

Browser	Description
Block Browser	Displays all the existing blocks and allows you to edit them. Display the loop and tag numbers to which the blocks belong.
Enhanced Report Utility Browser	Displays all loop numbers that are assigned to Enhanced Report Utility drawing layouts. You can reassign loop numbers to any available layout.
Loop Browser	Displays all the existing loop drawings with their revisions and generation types.

Control System Browser Group

The following table lists all the available browsers, and their descriptions, within the **Control System** browser group.

Browser	Description
NIM General Browser	Displays all the tag numbers that have been assigned to channels and associate these tags with appropriate point types. This browser uses Honeywell-specific terminology.
Control System Tag Browser	Display all the tag numbers that have been assigned to channels and enter custom information for the displayed tags. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)

Browser	Description
DeltaV Conventional Tag Browser	Displays all the conventional tag numbers available for publishing to DeltaV.
DeltaV Fieldbus Tag Browser	Displays all the fieldbus tag numbers available for publishing to DeltaV.
NIM Analog Input Browser	Displays all the tag numbers with the point type defined as NIM Analog Input. You can also set the control system tag parameters. This browser uses Honeywell-specific terminology.
NIM Analog Output Browser	Displays all the tag numbers with the point type defined as NIM Analog Output. You can also set the control system tag parameters. This browser uses Honeywell-specific terminology.
NIM Digital Input Browser	Displays all the tag numbers with the point type defined as NIM Digital Input. You can also set the control system tag parameters. This browser uses Honeywell-specific terminology.
NIM Digital Output Browser	Displays all the tag numbers with the point type defined as NIM Digital Output. You can also set the control system tag parameters. This browser uses Honeywell-specific terminology.
Publish Yokogawa CST (Conventional) Browser	Displays Yokogawa conventional control system tags intended for publishing. (Can be utilized when filtering device panels.)
Publish Yokogawa CST (FF) Browser	Displays Yokogawa fieldbus control system tags intended for publishing. (Can be utilized when filtering device panels.)

IMPORTANT

- The DeltaV and Yokogawa browsers are intended specifically for viewing the DCS data as described, and you should not make any customizations to these browsers using InfoMaker.
- Note that when defining a style for a control system browser, you must always select the Control System Tag field header (the CMPNT_SYS_TYPE-ID table column name).

Dimensional Data Browser Group

The following table lists all the available browsers, and their descriptions, within the **Dimensional Data** browser group.

Browser	Description
Default Data Browser	Displays default dimensional data for piping and allows you to edit the data.
Vendor Data Browser	Displays vendor dimensional data for piping and allows you to edit the data.

Browser	Description
Working Data Browser	Displays working dimensional data for piping and allows you to edit the data .(Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)

Construction and Commissioning Browser Group

The following table lists all the available browsers, and their descriptions, within the **Construction and Commissioning** browser group.

Browser	Description
Cable Schedule Installation Index Browser	Lists all the cables for the current unit or plant where you can change the Electrical Installation Index, edit cable descriptions, and so forth.
Cable Schedule Installation Index Changes Browser	Lists all the plant or unit cables, their attributes, installation index status and version.
Instrument Installation Index Browser	Allows you to generate an electrical, instrument, and mechanical installation report that includes the appropriate drawing references. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
Instrument Installation Index Changes Browser	Displays electrical, instrument, and mechanical installation changes that include the installation status and version. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)
Panel Termination Installation Index Browser	Displays the plant or unit device panels and their electrical index. (Can be utilized when filtering device panels.)
Panel Termination Installation Index Changes Browser	Displays the plant or unit device panels with their electrical installation index and installation changes. (Can be utilized when filtering device panels.)
Terminal Schedule Installation Index Browser	Displays the plant or unit termination schedule and the appropriate installation indexes. (Can be utilized when filtering device panels.)
Terminal Schedule Installation Index Changes Browser	Shows the plant or unit termination schedule and the installation index changes. (Can be utilized when filtering device panels.)
Wiring Schedule Installation Index Browser	Displays the plant or unit cable, cable set, and wire connections and their appropriate installation indexes.
Wiring Schedule Installation Index Changes Browser	Displays the plant or unit cable, cable set, and wire connections and their installation index changes.

Document Binder Browser Group

Browser	Description
Spec Binder Package Browser	Allows you to generate a browser that includes tag numbers belonging to a Specification Binder package, tag number attributes, package item number, and specification data. (Can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.)

Documents Browser Group

The following table lists all the available browsers, and their descriptions, within the **Documents** browser group.

Browser	Description
Archive Browser	Allows you to generate a document list of all archived documents associated with the report names that you selected in the Administration module for archiving, and then view and compare archived reports.
Drawing Browser	Allows you to generate a document list that shows the document name, type (P&ID, process data, calculation, specification, loop, or hook-up drawing), and custom field data.
Revision Browser	Allows you to generate a document revision browser that includes all drawings in the plant hierarchy and all their revisions.
Changes Log Browsers	These browsers allow you to generate reports that show when changes were made to the item type. You can generate reports for Cables, Control System Tags, Equipment, Instruments, Lines, Loops, Panels, and Wiring Equipment. IMPORTANT ▪ The Changes Log Panel browser can be utilized when filtering device panels. ▪ The Changes Log Instrument browser can be utilized when filtering I/O assignment data in the I/O Assignment Filter dialog box.

NOTE When items are deleted, the Changes Log browsers do not include these deletions as changes.

General Browser Group

The following table lists all the available browsers, and their descriptions, within the **General** browser group.

Browser	Description
Changes Log Browser	Displays changes to property values for items at the selected plant hierarchy level. This browser is only visible when the System Administrator selects the Item registry check box for the domain.
Task Browser	Displays tasks available in the To Do List (that is, tasks generated after you retrieve documents.

Telecom Browser Group

The following table lists all the available browsers, and their descriptions, within the **Telecom** browser group.

Browser	Description
End Point Amplifier Browser	Displays existing end point amplifier data. (Can be utilized when filtering device panels.)
End Point Hub Browser	Displays existing end point hub data. (Can be utilized when filtering device panels.)
End Point Intercom Browser	Displays existing end point intercom data. (Can be utilized when filtering device panels.)
End Point Miscellaneous Browser	Displays existing end point miscellaneous equipment data.(Can be utilized when filtering device panels.)
End Point PABX Browser	Displays existing end point PABX data. (Can be utilized when filtering device panels.)
Hub Cabinet Browser	Displays existing hub cabinet data. (Can be utilized when filtering device panels.)
Hub Equipment Browser	Displays existing hub equipment data.
Intercom Cabinet Browser	Displays existing intercom cabinet data. (Can be utilized when filtering device panels.)
Intercom Equipment Browser	Displays existing end point intercom equipment data.
Miscellaneous Cabinet Browser	Displays existing miscellaneous cabinet data. (Can be utilized when filtering device panels.)
Miscellaneous Equipment Browser	Displays existing miscellaneous equipment data. (Can be utilized when filtering device panels.)
PA Cabinet Browser	Displays existing PA cabinet data. (Can be utilized when filtering device panels.)

Browser	Description
PABX Cabinet Browser	Displays existing PABX cabinet data. (Can be utilized when filtering device panels.)
Port-Data Browser	Displays existing port data. (Can be utilized when filtering device panels.)

Browser Filters for Device Panels

The following table lists all the available browser filters that can be used when filtering device panels in the **Filter (Device Panels)** dialog box.

Browser Group	Browser
Control System	Publish Yokogawa CST (Conventional) Browser
Control System	Publish Yokogawa CST (FF) Browser
Construction and Commissioning	Panel Termination Installation Index Browser
Construction and Commissioning	Panel Termination Installation Index Changes Browser
Construction and Commissioning	Terminal Schedule Installation Index Browser
Construction and Commissioning	Terminal Schedule Installation Index Changes Browser
Documents	Changes Log Panel Browser
Telecom	End Point Amplifier Browser
Telecom	End Point Hub Browser
Telecom	End Point Intercom Browser
Telecom	End Point Miscellaneous Browser
Telecom	End Point PABX Browser
Telecom	Hub Cabinet Browser
Telecom	Intercom Cabinet Browser
Telecom	Miscellaneous Cabinet Browser
Telecom	Miscellaneous Equipment Browser
Telecom	PA Cabinet Browser
Telecom	PABX Cabinet Browser
Telecom	Port-Data Browser
Wiring	General Panel Browser
Wiring	I/O Card Browser

Browser Group	Browser
Wiring	I/O Terminal Browser
Wiring	Rack Browser
Wiring	Segment Assignment
Wiring	Strip Browser
Wiring	Terminal Browser
Wiring	Terminal Connection Browser

Browser Filters for I/O Assignment

The following table lists all the available browser filters that can be used when filtering instrument tags and control system tags in the **I/O assignment Filter** dialog box.

Browser Group	Browser
Instrument index	Calibration Results Browser
Instrument index	Calibration Settings Browser
Instrument index	Circuit Related Electrical Tag Browser
Instrument index	DDP and Index Browser
Instrument index	Drawing Summary Browser
Instrument index	Electrical Power Element Browser
Instrument index	Electrical Tag Browser
Instrument index	Fieldbus Tag Number List Browser
Instrument index	Function Requirement Browser
Instrument index	Instrument Connection Pre- assignment Browser
Instrument index	Instrument Connection Pre- assignment (Advanced) Browser
Instrument index	Instrument Index Standard Browser
Tag Number Browser	Instrument Type Browser
Tag Number Browser	JB – Index Browser
Tag Number Browser	Maintenance Schedule Browser
Tag Number Browser	Range Browser

Browser Group	Browser
Tag Number Browser	Tag Category Browser
Tag Number Browser	Tag Number Browser
Process Data and Calculation	All the browsers in this group
Specifications	Specifications Browser
Wiring	Device Panel Browser
Hook-Ups	Hook-Up Browser
Control System	Control System Tag Browser
Dimensional Data	Working Data Browser
Construction and Commissioning	Instrument Installation Index Browser
Construction and Commissioning	Instrument Installation Index Changes Browser
Document Binder	Spec Binder Package Browser
Documents	Changes Log Instrument

Browser Manager Commands

Available commands for the **Browser Manager**. The available options depend on the level and particular item that you select. Some options may be inactive depending on the item selected in the **Browser Group** data window.

Icon	Command	Shortcut	Explanation
None	Modules	None	Contains all the commands for starting SmartPlant Instrumentation modules. You can have multiple modules running simultaneously. The number of modules that you can run at the same time depends on your computer resources.
	Actions > Open View	Right-click	Opens the Browser View dialog box that displays the data using the settings defined in the Browser Manager. Note that you have to select a view before clicking this icon.
	Actions > Add View	Right-click	Adds a new view to the browser that you selected in the Browser Groups data window. This is active only when you select a browser.

Icon	Command	Shortcut	Explanation
	Actions > Delete	Right-click	Deletes the item you selected in the Browser Groups data window. Remember that you can undo only the last action!
None	Actions > Copy to other plant	Right-click	Opens a dialog box to select a target plant for copying a view selected in the Browser Manager.
None	Actions > Set as Default	Right-click	Sets the default view of the selected browser as the default browser view whenever starting SmartPlant Instrumentation with the Browser module.
	Actions > Copy	Right-click	Copies the item you selected in the Browser Groups data window.
	Actions > Paste	Right-click	Pastes the copied item into the Browser Groups data window. This icon becomes available after clicking Copy.
	Actions > Undo	Right-click	Undoes the last action. Remember that you can undo only the last action! If you close the Browser Manager, you will not be able to undo the last action after you reopen the Browser Manager.
None	Actions > Set Color for Read-Only Fields	None	Opens the Edit Color dialog box that enables you to set the background color of read-only fields that appear in the Browser View window. The default color is yellow.
	Actions > Find	Right-click	Finds a browser or a view in the Browser Groups data window. You can search using a whole word or just a part of a word.
None	Actions > Selection Options		Contains field selection commands for the Style Settings. (Only available when editing the style settings of a browser view.)
None	Actions > Selection Options > Select All	None	Selects all the check-boxes of all the available fields.
None	Actions > Selection Options > Clear All	None	Clears all the check-boxes of all the available fields.
None	Actions > Selection Options > Custom	None	Selects the check boxes of the available custom fields

Icon	Command	Shortcut	Explanation
None	Actions > Selection Options > Clear Custom	None	Clears all the custom field check- boxes.
None	Actions > Selection Options > Non-custom	None	Selects the check- boxes of fields that are not custom fields.
None	Actions > Selection Options > Clear Non- Custom	None	Clears the check- boxes of non- custom fields.
None	Browser		The options in this menu let you add custom browsers to the Browser Manager.
None	Browser > Form Browser	None	Opens the Add a Form Browser dialog box, where you can add a new specification form browser to the Specifications Group in the Browser Manager.
None	Browser > PowerSoft Browser	None	Opens the Add a PowerSoft Browser dialog box, where you can add a new custom browser created in InfoMaker. For details on how to create a custom browser in InfoMaker, see Creating a New Browser for SmartPlant Instrumentation.

SECTION 40

Adding New Browsers

SmartPlant Instrumentation is supplied with predefined browsers for you to view and manipulate your data. In addition, it is possible to add three kinds of browser that can be customized extensively. You can add the following browsers in the **Browser Manager**:

- **PowerSoft Browser** — a browser you create as a .psr report or a .pbd file using InfoMaker. You add such browsers to any group that you require using the **Browser Manager > Browser > PowerSoft Browser** option.
- **Single-Form Browser** — a specification form browser, whose format you generate and save in the **Spec Data Dictionary** of the Specifications module. You add such single-form browsers to the **Specifications** browser group using the using the **Browser Manager > Browser > Form Browser** option.
- **Multi-Form Browser** — a browser that allows you to display field headers and the values of field that are assigned to these headers in different specification forms. You generate such browsers using the **Multi-Form Browser Wizard** of the Specifications module. The software adds multi- form browsers automatically to the **Specifications** browser group. The names of multi-form browsers always start with the **Multi-Form** prefix.

CAUTIONS

- If you created browser views for a multi-form browser, and then, in the Specifications module, run the **Multi-Form Browser Wizard** to make changes to the browser fields, the software re-creates this browser and deletes all the existing views.
- On a multi-user database platform, before re-creating a multi-form browser, you must first make sure that other users have no views open for this browser. Re-creation of an existing browser when its view is open on another machine results in unstable software behavior and the software might close unexpectedly on the machine where the browser view is open.

Adding New Browsers Common Tasks

The following tasks are used when you add a new specification form or PowerSoft browser in SmartPlant Instrumentation.

Add a Single-Form Browser

Use this procedure to add single-form browsers to the **Specifications** browser group. The basis for a single-form browser is a browser format you generated in the **Spec Data Dictionary** in the Specifications module spec form with fields you made available using the **Field Properties** options of the **Spec Data Dictionary**. When you generate such a form in the Specifications module, the following rules and restrictions apply:

- A single-form browser only displays those fields that you set as available for the browser in the **Spec Data Dictionary**.
- A form browser displays the field headers that you set in the **Spec Data Dictionary**. The header names can differ from the header names in the actual forms and in the specifications based on these forms.
- You can add one form browser for each form.

For more information, see *Add a Single-Form Browser* (on page 586).

Test a Multi-Form Browser

Use this procedure to check whether you created a multi-form browser> successfully in the Specifications module. For more information, see *Test a Multi-Form Browser* (on page 587).

Create a PowerSoft Browser in InfoMaker

Use this procedure to create a custom browser using InfoMaker. InfoMaker gives you complete flexibility to specify any number of tables, fields, and database views, as you require. You can create single custom browsers as .psr files or save a group of custom browsers in a .pbl library. Then, in the Browser module, you can import several browsers from a library or import a single .psr file.

NOTES

- You must have a connection to the SmartPlant Instrumentation database to be able to select SmartPlant Instrumentation tables and fields.
- The procedure includes only those steps in InfoMaker that are required for creating a new browser for SmartPlant Instrumentation.

For more information, see *Create a PowerSoft Browser in InfoMaker* (on page 587).

Add a PowerSoft Browser

Use this procedure to add a custom browser created in InfoMaker as a .psr or .pbd file to a browser group in the **Browser Manager**. For this browser to be fully compatible with the Browser module, you must follow specific rules when creating the browser in InfoMaker.

IMPORTANT

- Only proficient users who have advanced knowledge of the database structure should attempt this advanced feature.
- You cannot perform report comparison for PowerSoft browsers.

For more information, see *Add a PowerSoft Browser* (on page 588).

Add a Single-Form Browser

IMPORTANT You must first generate and save a browser format in the Specifications module. For details, see *Define Form Browser Fields* (on page 230).

1. Open the **Browser Manager**.
2. Click **Browser Manager > Browser > Form Browser** to open the **Add a Form Browser** dialog box.
3. On the **Add a Form Browser** dialog box, select the specification forms for which you want to add single-form browsers to the **Specifications** browser group.
4. Click **Add**.

TIP

- You can display the **Notes** field in a view defined in the **Specifications** browser group and modify the contents one line at a time. To ensure that each new line will be visible in the specification itself, press **Ctrl + Enter** to add a carriage return.

Test a Multi-Form Browser

IMPORTANT You must first create a multi-form browser in the Specifications module. For details, see *Define a Multi-Form Browser* (on page 231).

1. Open the **Browser Manager**.
2. Under **Browser** groups, double-click **Specifications** to display all the browsers in the group.

TIP The multi-browser name string starts with **Multi-Form**.

3. Create a browser view and define field headers, form number and item numbers in the view style.

TIP In the browser view style, for each field header you defined for the browser, under **Table Column Name**, the software displays **C1**, **C2**, **C3**, and so forth. These are not field names but field group indicator values in the database. Since several form fields can be assigned to the same header, the software cannot display the field names in the **Style** section of the **Browser Manager**.

4. Open the browser view to see the results.

TIP In the browser view, the field headers you included in the browser should appear as column names and the values of the fields assigned to these headers in various spec forms should appear in the column cells.

Create a PowerSoft Browser in InfoMaker

1. In InfoMaker, click **File > New**.
2. On the **New** dialog box, on the **Library** tab, create a library where you can group newly-created browsers. The library file must be in .pbl format. For details, see *Create an InfoMaker Library* (on page 616).
3. Reopen the **New** dialog box and click the **Object** tab.
4. Select **Grid** for the report layout and click **OK**.
5. In the **Grid Report Generator Wizard**, select **SQL Select**, and then complete the Wizard steps.
6. On the **Select Tables** dialog box, select the tables that you require.
7. In the **Select** window, do the following:
 - Select fields from the tables.
 - Select a primary key from each table.
8. Click the **Return** icon to open the **Select Color and Border Settings** dialog box, where you can set the browser colors. After setting the browser colors, click **Next** and then click **Finish** to display the **Report preview** window.
9. In the report preview window, click the **Data Source** icon to reopen the **Select** window.
10. In the **Select** window, do the following:
 - a. On the **Design** menu, click **Convert to Syntax** to convert the selected fields from the graphic mode to the syntax mode.
 - b. Remove all the quotation marks (") from the displayed SQL statement.The following example shows how the final SQL statement should appear:

```
SELECT  component.cmpnt_name,
        component.cmpnt_serv,
        loop.loop_name,
        loop.loop_serv, component.cmpnt_id,
        loop.loop_id
FROM    component,
        loop WHERE  (loop.loop_id=component.loop_id )
        loop
```

11. Return to the report preview window and do the following:

- a. Set the header font style to **MS Sans Serif, 8 point, Bold**.
- b. Protect fields that you want to reserve for internal use (do not protect the primary keys) by setting the protected column attribute to **1** (one).
- c. For each header name, use the following naming convention: <column name>_t. For example, cmpnt_name_t.
- d. For each field name, use the following naming convention: <column name>. For example, cmpnt_name.
- e. Delete the **flag_color** field, and also delete all the columns that contain primary keys (the primary keys remain in the SQL statement).
- f. On the **General** tab, from the **Units** select list, select **Inches**.

IMPORTANT A report you create in InfoMaker is automatically assigned to PBUs (PowerBuilder units). You must change the units from PBUs to inches because the use of PBUs causes various display problems: the report print preview and printout may appear without a title block; instrument tags may not be grouped correctly on a single page and, instead, appear on individual pages.

12. Save the report data in one of the following ways:

- Without previewing, click **Save As** to save the report in the specially created .pbl library.
- Save the report as a stand-alone .psr file.

13. If you saved the report in the .pbl library, do the following:

- a. Copy the .pbl file to another location, preferably to the SmartPlant Instrumentation home folder, and then change the file extension from .pbl to .pbd.
- b. In the [CUSTOM] section of your Intools.ini file, add the following line (including the full pathname of the .pbd file):
LibraryList=XYZ.pbd.

Add a PowerSoft Browser

IMPORTANT

- You must follow specific rules when creating a new browser in InfoMaker. For more details, see *Create a PowerSoft Browser in InfoMaker* (on page 587).

1. Start the **Browser Manager**.
2. Click, **Browser > PowerSoft Browser**.
3. In the **Add a PowerSoft Browser** dialog box, click **Browse** next to the **File Name** field.
4. In the **Select a PowerSoft File** dialog box, do one of the following:
 - Navigate to a desired .psr file.
 - Navigate to a desired .pbd file and then, in the data window of the **Add a PowerSoft Browser** dialog box, select one or more PowerSoft forms belonging to the specified .pbd file.

TIP When defining settings for multiple PowerSoft forms belonging to the specified .pbd file, use the **Previous** and **Next** buttons, or click **Form List** and then select a PowerSoft form for which you want to define browser settings.

5. Click **OK** to open the **PowerSoft Browser Settings** dialog box.
6. In the **Browser** field, type the name of the target browser.
7. In the **Description** field, type the new browser description.
8. From the **Primary table** list, select the primary table for the new browser. This list contains all the tables that you selected when creating the report in InfoMaker.
9. From the **Primary value** list, select the value for the primary key name of the new browser. For example, in the COMPONENT table, the primary value is **CMPNT_NAME**.
10. From the **Browser group** list, select a browser group to which you want to assign the new browser.
11. From the **Access right item** list, select the item for the access rights definition. For example, **MODULE ACCESS – INDEX**.
12. From the **Default sort** list, select the default sort value.
13. From the **Item for enhanced reports** list, select an item on which to apply the Enhanced Report Utility macro filter.

IMPORTANT An Enhanced Report Utility macro filter is a filter for which you define conditions for displaying macro attributes in Enhanced Report Utility drawings. After you select an item from this list, in the Loop Drawings module, you can set filter conditions for Enhanced Report Utility drawings that use this browser data. For details, see Set Filter Conditions for Item Properties .

TIP If you want to work with the new browser in the Instrument Index module, select the **Define as browser for Instrument Index module** check box.

SECTION 41

Browser View Style Settings

You define style settings as part of the browser view customization. Style options allow you to display or define the style settings for a browser view that you select in the **Browser groups** pane. SmartPlant Instrumentation then uses these style settings to display your data associated with the current browser.

Style settings include the following options:

- Determining which fields the software displays in the **Browser View** window.
- Setting the order and width of the selected fields and determining how they appear in the **Browser View** window.
- Customizing the layout of a browser view for printing.
- Printing out the style setting data.

Style Settings Common Tasks

The following tasks are used frequently when customizing browser views in SmartPlant Instrumentation.

Display the Current Style Setting

This option shows you how to display the current style settings of the browser view that you select from the **Browser groups** list in the **Browser Manager**. If you have not yet defined a view profile for a selected browser, no style settings are available. For more information, see *Display the Current Style Setting* (on page 592).

Create a View Style

You use this option to create new style settings for a selected browser view. For more information, see *Create a View Style* (on page 593).

Modify Style Settings

This option enables you to modify existing style settings for a selected browser view. For more information, see *Modify Style Settings* (on page 595).

Define the Structure of a Print Layout

This option shows you how to structure the print layout of the data when printing out the data displayed in a customized **Browser View** window. You can select the fields that you want to be displayed in the print preview and the printout as well as do the following:

- Sequence the columns.
- Set the column width.
- Define the number of fields per column: a single field per column or multiple (no more than five) fields per column.
- Set the text and header font size.
- Set the header height.

For more information, see *Structure the Print Layout* (see "Define the Structure of a Print Layout" on page 596).

Clear a Print Layout Structure

This option shows you how to clear the existing print preview layout structure defined for the current browser view without clearing all the style settings for this browser view. For more information, see *Clear a Print Layout Structure* (on page 597).

Duplicate a View Style

This option shows you how to copy view style settings to another existing browser view. Note that this action overwrites the target style settings with the duplicated style settings. For more information, see *Duplicate a View Style* (on page 598).

Clear a View Setting

Use this option to clear all the style settings for a selected browser view. For more information, see *Clear a View Setting*. (see "Clear a View Setting" on page 594)

Print the Style Setting Data

Use this option to print out all the data that appears in the **Style** settings data window. You can print out the data for all the fields or just for the ones you have selected to view. For more information, see *Print the Style Setting Data* (on page 599).

Display the Current Style Setting

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. In the **Browser Manager**, highlight the required browser in the **Browser groups** data pane. For more information on how the browsers are organized, see *Browser Manager Hierarchy* (on page 563).
4. Expand the required browser view in the Browser Groups data window and do one of the following:
 - In the **Browser Groups** data window, click .
 - In the upper-right data window, double-click .
5. The fields currently used in the selected style are listed in **Style field list** pane, to the right of the **Browser groups** pane. The current style settings of the selected view are displayed in the lower pane.

Create a View Style

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. In the **Browser Manager**, add a new view profile or edit an existing one.
4. Do one of the following:
 - In the **Browser groups** data window, click .
 - In the upper-right data window, double-click .
5. On the lower **Style** pane, click **Edit**.
6. In the **Name** data field, type the new style name (defaults to Style followed by a number).
7. Select the **Enable current view in SmartPlant Explorer and in the Find Documents to Publish wizard** check box to make the current browser view available in the Domain Explorer, Reference Explorer, and all the other explorer windows in SmartPlant Instrumentation. After selecting this check box and saving the style settings, the current browser view becomes available in the **Show Browser** dialog box that you open from an explorer window.
8. Do one of the following to select the fields to be displayed in the browser view:
 - Select the appropriate **View** check boxes, by scrolling down the **Style** settings data window and selecting the required fields individually. Note that the primary value field is always selected, and a check mark appears in its **View** check box by default.
 - Select the **All** check box in the **Select** group box, to select all the available fields.
 - Select the **Custom** check box in the **Select** group box to select all the custom fields.
 - Select the **Non-custom** check box in the **Select** group box to select all the fields that are not custom fields.
9. Click the **Data Field Header** box to customize the header.

TIPS
 - Data field headers that you customize appear in the browser view column headers when using the current style to view the data. You can customize any data field header.
 - In addition to the database fields provided to you by default, the **Browser Manager** also provides you with custom fields, which you can use to complement data attributes. A user with Domain Administrator rights can make default custom field definitions in the Administration module.
 - It is not possible to display an apostrophe in a custom field header. If your definition includes an apostrophe character, this character changes in the header to a double quote character ". If your definition includes a double quote character, it changes in the header to a tilde character ~. Other special characters appear in custom field header as defined.
10. Click in the **Length** data field to edit the field's maximum number of characters displayed in the **Browser View** when using the current style to view the data.
11. If you want to display in the **Browser View** print preview or print out the sum or average value of any numeric field, select its **Sum** and/or **Avg.** check box. For non-numeric fields, the **Sum** and **Avg.** check boxes are disabled.

12. To set the sorting options, do one of the following:
 - Click any header (**Data Field header**, **Table Column Name**, **Length**, **View**, **Sum**, or **Avg.**) to sort the fields that appear in the **Style** settings section in an ascending order (click again on the same header to sort the displayed fields in a descending order.)
 - Select the **Default Sort** check box when available to revert to the default sorting order (the way the fields are arranged in the database). The **Default Sort** option is available only if you changed the sort order by clicking any header in the **Style** settings screen section.
13. To set the width and sequence of the selected fields, do the following:
 - a. Click **Customize** to open the **Column Layout** dialog box.
 - b. To change the field sequence, drag the header of the field that you want to move to the left or to the right, then release the mouse button to drop the column in the new location.
 - c. To resize the column width, point to the right or left edge of the column you want to resize so that the mouse pointer changes its shape to a double-headed arrow. Drag the column edge either to the left or to the right until the column matches the required width.
14. Click **OK** to close the **Column Layout** dialog box and save the changes that you made to the column layout field and the style settings.

TIP Clicking **OK** in the **Column Layout** dialog box saves the new column layout field and the changes you made to the style settings in the Browser Manager. Therefore, when you return to the Browser Manager the Save button automatically changes to Edit. Clicking **Cancel** returns you to the **Style** settings to continue creating your view style.
15. If changes have been made that have not been saved, the **Save** button will be visible, click **Save** to save your new style settings.

NOTE

- In the **Style** settings data window, red is used to symbolize a selected field. Yellow is used to symbolize a read-only field which cannot be accessed in the browser for data editing. You can set a different color for the read-only fields.

Clear a View Setting

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. In the **Browser Manager**, display the style settings you want to modify. For more information, see *Display the Current Style Setting* (on page 592).
4. Do one of the following:
 - If the **Enable current view in SmartPlant Explorer and in the Find Documents to Publish** is not enabled, proceed to the next step.
 - In the **Style** pane, if the **Enable current view in SmartPlant Explorer and in the Find Documents to Publish** is enabled do the following:
 - i. In the Domain Explorer, select an appropriate folder.
 - ii. Right-click, and from the shortcut menu select **Show Browser**.

- iii. In the **Show Browser** dialog box, make sure the **Browser View** you want to delete is not displayed and click **OK**.
 - iv. On the **Style** pane, click **Edit**.
 - v. Clear the **Enable current view in SmartPlant Explorer and in the Find Documents to Publish** check box.
 - vi. Click **Save**.
5. Click **Edit**.
6. Do one of the following:
 - Click .
 - Click **Actions > Delete**.

Modify Style Settings

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. In the **Browser Manager** display the style settings you want to modify.
4. On the lower **Style** pane, click **Edit**.
5. In the **Name** field, type the new style name (defaults to Style followed by a number).
6. Do one of the following to select the fields to be displayed in the browser view:
 - Select the appropriate **View** check boxes, by scrolling down the **Style** settings data window and selecting the required fields individually. Note that the primary value field is always selected, and a check mark appears in its **View** check box by default.
 - Select the **All** check box in the **Select** group box, to select all the available fields.
 - Select the **Custom** check box in the **Select** group box to select all the custom fields.
 - Select the **Non-custom** check box in the **Select** group box to select all the fields that are not custom fields.
7. Click the **Data Field Header** box to customize the header name.

TIPS

- **Data Field Headers** that you customize appear in the browser view column headers when using the current style to view the data. You can customize any **Data Field Header**.
 - In addition to the database fields provided to you by default, the **Browser Manager** also provides you with custom fields, which you can use to complement data attributes. A user with Domain Administrator rights can make default custom field definitions in the Administration module.
 - It is not possible to display an apostrophe in a custom field header. If your definition includes an apostrophe character, this character changes in the header to a double quote character ". If your definition includes a double quote character, it changes in the header to a tilde character ~. Other special characters appear in custom field header as defined.
8. Click in the **Length** data field to edit the field's maximum number of characters displayed in the **Browser View** when using the current style to view the data.

9. If you want to display in the **Browser View** print preview or print out the sum or average value of any numeric field, select its **Sum** and/or **Avg.** check box. For non-numeric fields, the **Sum** and **Avg.** check boxes are disabled.
10. To set the sorting options, do one of the following:
 - Click any header (**Data Field Header**, **Table Column Name**, **Length**, **View**, **Sum**, or **Avg.**) to sort the fields that appear in the **Style** settings section in an ascending order (click again on the same header to sort the displayed fields in a descending order.)
 - Select the **Default Sort** check box when available to revert to the default sorting order (the way the fields are arranged in the database). The **Default Sort** option is available only if you changed the sort order by clicking any header in the **Style** settings screen section.
11. To set the width and sequence of the selected fields, do the following:
 - a. Click **Customize** to open the **Column Layout** dialog box.
 - b. To change the field sequence, drag the header of the field that you want to move to the left or to the right, then release the mouse button to drop the column in the new location.
 - c. To resize the column width, point to the right or left edge of the column you want to resize so that the mouse pointer changes its shape to a double-headed arrow. Drag the column edge either to the left or to the right until the column matches the required width.
12. Click **OK** to close the **Column Layout** dialog box and save the changes that you made to the field layout and the style settings.

TIP Clicking **OK** in the **Column Layout** dialog box saves the new field layout and the changes you made to the style settings in the **Browser Manager** . Therefore, when you return to the **Browser Manager** the **Save** button automatically changes to **Edit**. Clicking **Cancel** returns you to the **Style** settings to continue creating your view style.
13. If changes have been made that have not been saved, the **Save** button will be visible, click **Save** to save your new style settings.

NOTE In the **Style** settings data window, red is used to symbolize a selected field. Yellow is used to symbolize a read-only field which cannot be accessed in the browser for data editing. You can set a different color for the read-only fields.

Define the Structure of a Print Layout

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. In the **Browser Manager** display the style settings you want to modify.
4. Click **Edit**.
5. Click **Layout** to open the **Define Print Layout** dialog box.

6. Select a field from the **Column Header** pop-up window and drag it to the field where you want it to appear. Your print layout can take the form of single fields in each column or multiple (no more than 5) fields in a column. Remember that the fields that you do not select from the **Column Header** pop-up window will not show up in the printout even though they exist in the current browser. Note, however, that if you decide to display two or more fields in a column, the printed out report will not display the **Group Row Count**, nor will it show the sum and/or average field values even if you have selected these options.
7. Click **Font** to open the **Customize Font Size** dialog box, where you can customize the column and header font size as well as the column and header height.
8. Set the font sizes as required using the spinners:
 - a. Use the **Column Font Size** spinner to define the font size.
 - b. Use the **Column Height** spinner to define the column height. Note that if you do not define the column height before generating the layout, the **Define Print Layout** dialog box does not display any data.
 - c. Use the **Header Font Size** spinner to define the header font size.
 - d. Use the **Header Height** spinner to define header height size.
9. Click **OK** to accept your settings and return to the **Define Print Layout** dialog box.
10. Click **Generate** to open the **Generate Print Layout** dialog box where you customize the column sequence and size.
11. Set the layout structure as follows:
 - a. Set the column sequence by dragging the column header to the required position.
 - b. Set the column size by dragging the edge of the column either to left or to the right.
 - c. Click **OK** to accept the settings and return to the **Define Print Layout** dialog box.
12. Click **Save** to save all the settings and close to the **Define Print Layout** dialog box.

Clear a Print Layout Structure

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. In the **Browser Manager**, display the style settings you want to modify. For more information, see *Display the Current Style Setting* (on page 592).
4. Click **Edit**.
5. Click **Print Layout**.
6. In the **Print Layout** dialog box, click **Clear**.
7. Click **Save**.

Duplicate a View Style

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. In the **Browser Manager**, display the style settings you want to modify. For more information, see *Display the Current Style Setting* (on page 592).
4. Select the style that you want to duplicate.
5. Do one of the following:
 - Click .
 - Click **Actions > Copy**.
 - Right-click the highlighted style in the **Browser groups** data window and then, on the shortcut menu, click **Copy**.
6. Navigate to the target style whose settings you want to replace with ones you copied.
7. Highlight the selected target style.

IMPORTANT If you close the **Browser Manager** at this stage, you cannot paste the duplicated style settings.
8. Do one of the following:
 - Click .
 - Click **Actions > Paste**.
 - Right-click and on the shortcut menu, click **Copy**.

Print the Style Setting Data

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. Click **Print** to open the **Print Preview** window.
4. In the **Show Fields** group box, do one of the following:
 - Select **All** to display and print out all the data for all the fields appearing in the **Style settings** screen section.
 - Select **Selected** to display and print out the data for only those fields that you selected to be viewed.
5. Perform any of the following actions as required:
 - Click **Zoom** to select your preview magnification level.
 - Click **Save As** to save the data as an external file.
 - Click **Print** to start printing.

SECTION 42

Browser View Sort Settings

A browser view sorting sequence determines the sequence in which the selected rows are displayed in the **Browser View** window. In addition to defining a sorting sequence for the **Browser View** window, you also determine whether the displayed rows will be sorted in an ascending or descending order. Note that you will also be able to sort the selected fields in the **Browser View** window that will override your sort sequence settings. You can perform the following activities:

- Create and modify a view sorting sequence.
- Duplicate a view sorting sequence.
- Clear the existing view sorting sequence settings.

Sort Settings Common Tasks

The following tasks are used frequently when you define the sorting sequence for your browser view.

Display the Current Sorting Sequence

This option shows you how to display the current sorting sequence for an existing browser view that you select from the **Browser Groups** list in the **Browser Manager**. Note that if you have not yet defined a view profile for a selected browser, no sorting sequence will be available. For more information, see *Display the Current Sorting Sequence* (on page 602).

Create a Sorting Sequence View

This option shows you how to create a new sorting sequence for a selected browser view. For more information, see *Create a Sorting Sequence View* (on page 602).

Modify a Sorting Sequence View

This option shows you how to modify an existing view sorting sequence. For more information, see *Modify a Sorting Sequence View* (on page 603).

Duplicate a Sorting Sequence View

This procedure shows you how to copy an existing sorting sequence to another existing browser view. This action overwrites the target sorting sequence with the duplicated style settings. For more information, see *Duplicate a Sorting Sequence View* (see "*Modify a Sorting Sequence View*" on page 603).

Clear a Sorting Sequence Setting

This option shows you how to remove an existing sorting sequence. For more information, see *Clear a Sorting Sequence Setting* (on page 605).

Display the Current Sorting Sequence

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. In the **Browser Manager**, expand the required browser group, to navigate to the browser view in the **Browser groups** data pane. For more information on how the browsers are organized, see *Browser Manager Hierarchy* (on page 563).
4. Expand the required browser view in the **Browser groups** data pane and do one of the following:
 - In the **Browser groups** data pane, click .
 - In the upper-right data pane, double-click .

NOTE The fields currently selected for the sorting sequence are listed in the right data pane (with the caption **Sort field list**) and the current sorting sequence of the selected view is displayed in the lower data pane. You can now modify the sorting sequence as needed.

Create a Sorting Sequence View

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. In the **Browser Manager**, add a new view profile or edit an existing one. For more details, see *Define a View Profile* (on page 565).
4. Expand the required browser view in the **Browser groups** data pane and do one of the following:
 - In the **Browser groups** data pane, click .
 - In the upper-right data pane, double-click .
5. Click **Edit**.
6. In the **Name** box, type the required sorting sequence name (defaults to **Sort** followed by a number).
7. Under **Data Field Header**, from the list of database fields, select a sort field according to which you want the data to be sorted in the browser view.

TIPS

- For any browser view that supports sorting data by tag numbers, you can sort tag numbers according to the numeric segment. From the **Data Field Header** list, select **Tag Trans Name**, and define the sort sequence in the **Start Char** and **Length** fields.

- For any browser view that supports sorting data by loop numbers, you can sort loop numbers according to the numeric segment. From the **Data Field header** list, select **Loop Trans Name**, and define the sort sequence in the **Start Char** and **Length** fields.
- 8. In the **Start Char.** data field, type the starting position of the current segment, that is, the selected sorting field leftmost character.
- 9. In the **Length** data field, type the total number of characters (from the starting character) the selected sorting field will contain.
- 10. Under **Order**, clear the **Ascending** check boxes if you want the data to be sorted and displayed in the Browser in a descending order. The default setting is **Ascending**.
- 11. Click **Insert** to insert a sorting field before the one currently selected in the **Sort** settings group box.
- 12. Click **Delete** to remove the currently selected field from the sorting sequence.
- 13. To resize and re-sequence the fields currently displayed in the **Sort settings** group box, do the following:
 - a. Drag and drop a field to a new position to change the field sequence.
 - b. To change the width of a field, position the cursor on the border between two fields and then drag the order to the right or to the left.
- 14. Click **Save** to save the new sorting sequence. The **Sort Field** List data window displays the sorting sequence you have created.

Modify a Sorting Sequence View

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. Expand the required browser view in the **Browser groups** data pane and do one of the following:
 - In the **Browser groups** data pane, click .
 - In the upper-right data pane, double-click .
4. Click **Edit**.
5. In the **Name** box, type the required sorting sequence name (defaults to **Sort** followed by a number).
6. Under **Data Field Header**, from the list of database fields, select a sort field according to which you want the data to be sorted in the browser view.
7. In the **Start Char.** data field, type the starting position of the current segment, that is, the selected sorting field leftmost character.
8. In the **Length** data field, type the total number of characters (from the starting character) the selected sorting field will contain.
9. Under **Order**, clear the **Ascending** check boxes if you want the data to be sorted and displayed in the Browser in a descending order. The default setting is **Ascending**.
10. Click **Insert** to insert a sorting field before the one currently selected in the **Sort** settings group box.

11. Click **Delete** to remove the currently selected field from the sorting sequence.
12. To resize and re-sequence the fields currently displayed in the **Sort settings** group box, do the following:
 - a. Drag and drop a field to a new position to change the field sequence.
 - b. To change the width of a field, position the cursor on the border between two fields and then drag the order to the right or to the left.
13. Click **Save** to save the modified sorting sequence. The **Sort Field** List data window displays the sorting sequence you have created.

Duplicate a Sorting Sequence View

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. Expand the **Browser groups** tree to display the sort sequence you want to duplicate.
4. Highlight the sorting sequence, and do one of the following:
 - Click .
 - Click **Actions > Copy**.
5. Navigate to the target sorting sequence whose setting you want to replace with the copied settings.
6. Highlight the sorting sequence, and do one of the following:
 - Click .
 - Click **Actions > Paste**.

Clear a Sorting Sequence Setting

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. Expand the required browser view in the **Browser groups** data pane and do one of the following:
 - In the **Browser groups** data pane, click .
 - In the upper-right data pane, double-click .
4. Click **Edit**.
5. Do one of the following:
 - Click .
 - Click **Actions > Delete**.

SECTION 43

Browser View Filter Settings

These settings allow you to define a filtering condition which will be used to filter the data associated with the selected browser view.

A filter consists of:

- Field name
- Operator or function
- Value
- Logical expressions: **And** –or– **Or** (for complex filter conditions)

IMPORTANT A complex filter condition may take longer to retrieve your data. For this reason, performing an **OR** operation is more time-consuming than performing an **AND** operation.

NOTE The filter conditions that you apply determine the scope of data that is published from browsers.

The following table lists the built-in operators and functions available to you when defining the filter settings:

Operator/Function	Description	Example
=	Equal to	Manufacturer = "Shell"
>	Greater than	Tag Number > 101
<	Less than	Process Function Name < 'P'
>=	Greater or equal to	Velocity >= 10
<=	Less than or equal to	Low Alarm <= 30
<>	Not equal to	Loop Suffix<> 100
BETWEEN	Select an alphanumeric value that is between the stated expression.	Price between 150 and 250
LIKE (value)	Select a similar value that is similar to the one in the '[value]'field. You can use the following wildcard characters: % – any combination of characters. _ – any single character.	Tag Number LIKE '%AA%' Process Function Name LIKE P__
IS NULL	Contains an undefined value	Service IS NULL
IS NOT NULL	Not equal to NULL	Loop Number IS NOT NULL
AND	Include the following expression in the filter combination.	
OR	Accept either the previous or the following expression in the filter expression.	

View Filter Settings Common Tasks

The following tasks are used frequently when working with filter settings in a browser view.

Display the Current View Filter Condition

You use this option to display the current filter condition of browser view that you select from the **Browser groups** list in the **Browser Manager**. If you have not yet defined a filter condition for a selected browser, no filter settings will be available. For more information, see *Display the Current View Filter Condition* (on page 608).

Define a View Filter

This procedure shows you how to define a new filter condition for a selected browser view. For more information, see *Define a View Filter* (on page 609).

Modify a View Filter

This option shows you how to modify an existing filter condition for a selected browser view. For more information, see *Modify a View Filter* (on page 610).

Duplicate a View Filter

This option enables you to copy an existing filter condition to another existing browser view. This action overwrites the target filter condition with the duplicated filter condition. For more information, see *Duplicate a View Filter* (on page 611).

Clear View Filter Settings

This option shows you how to clear the filter condition for a selected browser view. For more information, see *Clear View Filter Settings* (on page 611).

Display the Current View Filter Condition

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. In the **Browser Manager**, highlight the required browser in the **Browser groups** data pane. For more information on how the browsers are organized, see *Browser Manager Hierarchy* (on page 563).
4. Expand the required browser view in the **Browser groups** data pane and do one of the following:
 - In the **Browser groups** data pane, click .
 - In the upper-right data pane, double-click .

NOTE The filter condition you define is displayed in the **Filter field list** in the right data pane.

Define a View Filter

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. In the **Browser Manager**, highlight the required browser in the **Browser groups** data pane. For more information on how the browsers are organized, see *Browser Manager Hierarchy* (on page 563).
4. Expand the required browser view in the **Browser groups** data pane and do one of the following:
 - In the **Browser groups** data pane, click .
 - In the upper-right data pane, double-click .
5. Click **Edit**.
6. In the **Name** data field, type the required filter condition name.
7. Click the **Data Field Header** and select an appropriate item header according to which you want to filter the data in the **Browser View** window, for example, **Tag Number**.
- TIP** The **Data Field Header** list contains all the field headers used for the data that the current browser is associated with.
8. Click **Operator** and select a suitable operator to determine how the tag number attribute selected from the **Column Name** list will relate to the expression in the **Value** field. For more information on filter operators, see View Filter Settings.
9. In the **Value** data field, select or type a suitable value to determine how the tag number attribute selected from the **Column Name** list are specified.
10. Depending on whether you want to add another filtering condition, in the **Logical** data field, do one of the following:
 - Leave the field empty if the condition is the last one in the list.
 - Click the field and select either **And** or **Or** as the logical function from the list if the condition is to be followed by another one. Select **And** to include the following expression in the filter condition. Select **Or** to accept either the previous or the following expression in the filter condition.
11. Click **Verify** to verify the current filtering condition.
12. Perform any of the following actions as required:
 - Click **Insert** to append new a data line.
 - Click **Delete** to delete the currently selected data line.
 - Click **Save** to save the new filter settings.

TIP The **Filter field list** data pane displays the filter condition you have just defined.

NOTE The filter conditions that you apply determine the scope of data that is published from browsers.

Modify a View Filter

1. Start the Browser Manager by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. Expand the browser view you want to modify in the **Browser groups** data pane and do one of the following:
 - In the **Browser groups** data pane, click .
 - In the upper-right data pane, double-click .
4. Click **Edit**.
5. In the **Name** data field, type the required filter condition name (defaults to Filter followed by a number).
6. Click the **Data Field Header** and select the field from the list.

TIP The **Data Field Header** list contains all the fields that are used for the data that the current browser is associated with.
7. Click the **Operator** data field and select the required operator from the list.
8. In the **Value** data field, select or type a suitable value.
9. Depending on whether you want to add another filtering condition, in the **Logical** data field, do one of the following:
 - Leave the field empty if the condition is the last one in the list.
 - Click the field and select either **And** or **Or** as the logical function from the list if the condition is to be followed by another one.
10. Click **Verify** to verify the current filtering condition.
11. Perform any of the following actions as required:
 - Click **Insert** to append new a data line.
 - Click **Delete** to delete the currently selected data line.
 - Click **Save** to save the new filter settings.

TIP The **Filter field list** data pane displays the filter condition you have just defined.

Duplicate a View Filter

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. Expand the browser view you want to duplicate in the **Browser groups** data pane and do one of the following:
 - Click .
 - Click **Actions > Copy**.
4. Navigate to the target filter condition that you want to replace with the one you copied.
5. Highlight the selected filter condition, and do one of the following:
 - Click .
 - Click **Actions > Paste**.

Clear View Filter Settings

1. Start the **Browser Manager** by doing one of the following:
 - Click **File > Browser Manager**.
 - Click .
2. If the **Browser View** is open, then open the **Browser Manager** by doing one of the following:
 - Click **Actions > Manager**.
 - Click .
3. In the **Browser groups** pane, expand the browser view you want to clear the view filter settings from, and do one of the following:
 - In the **Browser groups** data pane, click .
 - In the upper-right data pane, double-click .
4. Do one of the following:
 - Click .
 - Click **Actions > Delete**.

PSR File Customization Using InfoMaker

Using InfoMaker, you can define SmartPlant Instrumentation database profiles and customize various SmartPlant Instrumentation reports, title blocks, and specification or calibration form pages saved as .psr files. Customization includes emphasizing particular fields or data, inserting graphic objects, assigning field background colors, defining expressions for regular and computed fields, and so forth. For complete information on InfoMaker options, see the InfoMaker documentation.

IMPORTANT

- You must have working knowledge of the SmartPlant Instrumentation database table structure to be able to customize reports, specification or calibration form pages. For further information, refer to the SmartPlant Instrumentation Data Dictionary, which is available upon request.
- SmartPlant Instrumentation 2009 is only compatible with InfoMaker 11 Service Pack 2. The latest InfoMaker Service Pack is available from the Sybase Web site (accessible via the InfoMaker **Help** menu).

SmartPlant Instrumentation Database Structure

The following discussion is a very broad explanation of the internal structure of the SmartPlant Instrumentation database. It is not meant to be a database primer, but rather an aid for the user to have a better understanding of what tables to select when customizing a report in InfoMaker.

Two of the important features of the SmartPlant Instrumentation database are its **hierarchical** and **relational** structure.

Hierarchical Structure of the Database

The SmartPlant Instrumentation database consists of a hierarchy, where each level of the hierarchy contains tables that are specific to that level. The highest level of the hierarchy is the Admin schema. On the next level of the hierarchy, there is a Domain schema for each domain you initialize in the database. Schemas include tables. Tables include table columns, which are represented in the interface as data fields.

Within each domain, there are plant hierarchy levels. By default, each domain has three default levels as follows: <plant>, <area>, and <unit>. The following table shows most common types of data you can define at each level of the hierarchy:

Level	Table Data Included	Notes
Admin schema	Users, user groups, naming conventions, access rights	
Domain schema	instrument types and other supporting tables, spec forms, reference wiring data	
<Plant>	Wiring data, custom fields	
<Area>	None	Used as a container only
<Unit>	Loops, instruments	The software checks uniqueness at the <unit> level

There is a connection between the data settings at each level of the plant hierarchy, for example, an instrument tag includes data from various tables at the following levels:

- COMPONENT table (contains instruments) at the <unit> level
- Supporting tables at the domain level
- PD_GENERAL table (contains process functions, such as pressure, flow, temperature, and so forth) at the <unit> level
- SPEC_SHEET_DATA table (contains specification data) at the <unit> level

NOTE The schema name always appears prefixed to the table name separated by a period (.). For example, if your Domain schema logon name is DEMO, and in InfoMaker you select CABLE as your table name, the table name in InfoMaker appears are **DEMO.CABLE**. For details of database schemas and their descriptions, see *Internal Setup Utility Online Help, Database Structure and Schemas*.

Relational Structure of the Database

The relational structure of the database is concerned with the associations defined between tables and columns. For example, if you want to create a customized cable report that includes only the cable description, color, manufacturer, and model, you need to know that these are columns that are associated with their respective tables. The following is a summary for this example, taken from the SmartPlant Instrumentation Data Dictionary.

Full Table Name	Table Description	Table Column Name	Display Name
DEMO.CABLE	Information stored about the existence of a cable	cable_desc	Cable Description
DEMO.CABLE_COLOR	The list of colors available for all cables	cable_color_name	Cable Color
DEMO.CABLE_MFR	The data structure for a list of cable manufacturers	cable_mfr_name	Cable Manufacturer
DEMO.CABLE_MFR_MODEL	The model of the cable	cable_mod_name	Cable Model

NOTE The SmartPlant Instrumentation Data Dictionary, which is available upon request, contains complete information about tables and columns.

See Also

Working with Libraries and Reports Common Tasks (see "Working with Libraries and Reports" on page *Drop-Down Data Windows that Retrieve Units of Measure* (on page 623))

Create a SmartPlant Instrumentation Database Profile

Use this procedure to create a database profile in InfoMaker so that you automatically connect to your database when opening InfoMaker. InfoMaker automatically creates database profiles for various types of data. However, you may find that your parameter settings do not point to the SmartPlant Instrumentation data source. In such cases, you need to enter the proper profile settings to connect to the SmartPlant Instrumentation database.

1. With the main **InfoMaker** window open, click .
2. On the **Database Profiles** dialog box, select **ODB ODBC**.
3. Click **New**.
4. In the **Database Profile Setup** dialog box, on the **Connection** tab, do the following:
 - a. In the **Profile Name** box, type the profile name.
 - b. From the **Data source** box, select the SmartPlant Instrumentation database you want to connect to.
 - c. In the **User ID** box, type the target schema logon name.
 - d. In the **Password** box, type the target schema logon password.

NOTES

- If you want to connect to the Admin schema of the demo database in Sybase Adaptive Server Anywhere, the default value for both the **User ID** and **Password** properties is **IN_DBAMN**.
 - If you want to connect to the Domain schema of the demo database, the default value for both the **User ID** and **Password** properties is **demo**.
5. When finished, click **OK** to reopen the **Database Profiles** dialog box, where the current SmartPlant Instrumentation database profile is selected by default.
 6. Select the database profile and click **Connect** to make the connection with the profile.

Display SmartPlant Instrumentation Data Automatically

Use this procedure to display all rows or a particular SmartPlant Instrumentation database table.

1. After connecting to the SmartPlant Instrumentation database, on the main **InfoMaker** window menu bar, click **Tools > Database Painter**.
2. In the tree view, double-click the appropriate SmartPlant Instrumentation database profile.
3. Double-click the **Tables** folder to display all the tables that exist in SmartPlant Instrumentation.

TIP If the Domain schema name precedes most of the table names, you are connected to the Admin schema.

4. To display all rows of a particular table, right-click a table, and then, on the shortcut menu, click **Edit Data > Grid**.

Display SmartPlant Instrumentation Data by Executing an SQL Statement

Use this procedure to display selected rows or a particular SmartPlant Instrumentation database table by executing an SQL statement.

1. After connecting to the SmartPlant Instrumentation database, on the main **InfoMaker** window menu bar, click **Tools > Database Painter**.
2. In the tree view, double-click the appropriate SmartPlant Instrumentation database profile.
3. To display selected rows of a particular table, in the **ISQL Session** pane (bottom right pane by default), click the **ISQL Session** tab.

4. Type a Select statement.

NOTE If you are connected to the Admin schema of SmartPlant Instrumentation and want to select rows from a Domain schema table, you must include the Domain schema name in the SQL statement using the following syntax **<Domain schema name>.<SQL Statement>;**

5. After typing the SQL statement, do one of the following:
 - Select the statement and press **Ctrl+L**.
 - Right-click the statement, and then, on the shortcut menu, click **Execute**.

Define InfoMaker As the Default Report Generator

After you complete the installation of InfoMaker, you can define InfoMaker as your default report generator. After that, you can open InfoMaker from SmartPlant Instrumentation.

1. In SmartPlant Instrumentation, on the menu bar, click **File > Preferences**.
2. On the **Preferences** dialog box, in the left pane, click **Report Generator**.
3. From the **Report generator** list, select **InfoMaker**.
4. Beside the **Report generator program path** box, click **Browse** to navigate to the location of the InfoMaker executable file on your computer, and click **OK**.

Working with Libraries and Reports

The following tasks deal with creating new libraries in InfoMaker and opening SmartPlant Instrumentation reports saved as .psr files. You might need to create a new library to manage reports or save queries. Also, you can create new browsers for adding in the Browser module of SmartPlant Instrumentation.

Create an InfoMaker Library

Use this procedure to create an InfoMaker library for SmartPlant Instrumentation reports. Also, before building a query, you need to create a backup library. The software automatically puts all queries that you save into this library.

1. With the main **InfoMaker** window open, click .
2. On the **New** dialog box, click the **Library** tab.
3. Double-click the **Library** icon .
4. On the **Specify New Library** dialog box, type the desired path and name of the library, which must be a .pbl, or click the ellipsis  beside the **Library** box to navigate to the .pbl file.
5. Click **Finish**.

Create an InfoMaker Library and Report for Editing PSR Files

Use this procedure to create an InfoMaker library and report. Then, in SmartPlant Instrumentation, you can open the report from within the InfoMaker library.

NOTE Before performing this procedure, make sure that InfoMaker is defined as your default report generator. For details, see *Define InfoMaker As the Default Report Generator* (on page 615).

1. From any SmartPlant Instrumentation window, click **File > Generate Reports** to open InfoMaker.
2. In InfoMaker, create a new library. For details, see *Create an InfoMaker Library* (on page 616).
3. Define a report as follows:
 - a. Click **File > New**.
 - b. On the **New** dialog box, on the **Object** tab, select **Freeform** and click **OK**.
 - c. In the **Freeform Report Generator** dialog box, select **External** and click **Next**.
 - d. On the **Define Result Set** dialog box, in the **Name** box, type a name for the result description, and click **Next**. The name cannot contain spaces.
 - e. On the **Select Color and Border Settings** dialog box, click **Next**.
 - f. On the **Ready to Create Freeform** dialog box, click **Finish**.
 - g. If the **Database Profiles** dialog box opens, follow the procedure *Create a SmartPlant Instrumentation Database Profile* (on page 614).
4. In the **Report** window, do the following to save the report that you just defined:
 - a. Click **File > Save**.
 - b. On the **Save Report** dialog box, under **Reports**, type a name for the report.
 - c. Make sure that under **Libraries** the correct library is selected and then click **OK**.

TIP To organize your display of .psr files in InfoMaker, create various reports within various libraries.
5. In the **Report** window, click **File > Open File**.
6. On the **Select a File Name** dialog box, navigate to the .psr file that you want to open, and click **Open**.

Open a PSR File from an InfoMaker Library and Report

Use this procedure to open an existing .psr file with SmartPlant Instrumentation data from the pre-defined InfoMaker library and report. SmartPlant Instrumentation reports can be saved as external .psr files, edited in InfoMaker, and then opened in SmartPlant Instrumentation from within an InfoMaker library and report.

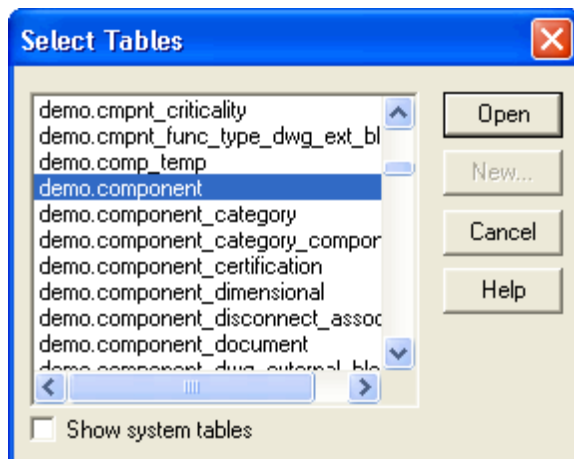
NOTE Before performing this procedure, make sure that InfoMaker is defined as your default report generator. For details, see *Define InfoMaker As the Default Report Generator* (on page 615).

1. From any SmartPlant Instrumentation window, on the menu bar, click **File > Generate Reports** to open InfoMaker.
2. In InfoMaker, on the menu bar, click **File > Open**.
3. On the **Open** dialog box, do the following:
 - a. Under **Library**, select the appropriate library.
 - b. Under **Object Type**, select **Reports**.
 - c. Under **Object**, select the desired report from the list.
 - d. Click **OK**.
4. Click **File > Open File**.
5. On the **Select a File Name** dialog box, navigate to the .psr file that you want to open, and click **Open**.

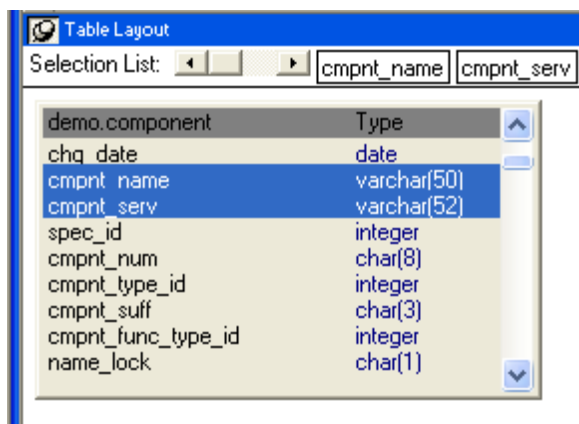
Build a Query

This procedure describes how to build a query, which is necessary for exporting SmartPlant Instrumentation data to an external file that you can use to generate an InfoMaker report. The customized report created in this procedure is limited to only one data source and presentation style with no other adornments. This example uses information from the Instrument Index module to generate a report for the description of a set of instruments, including their service and function type.

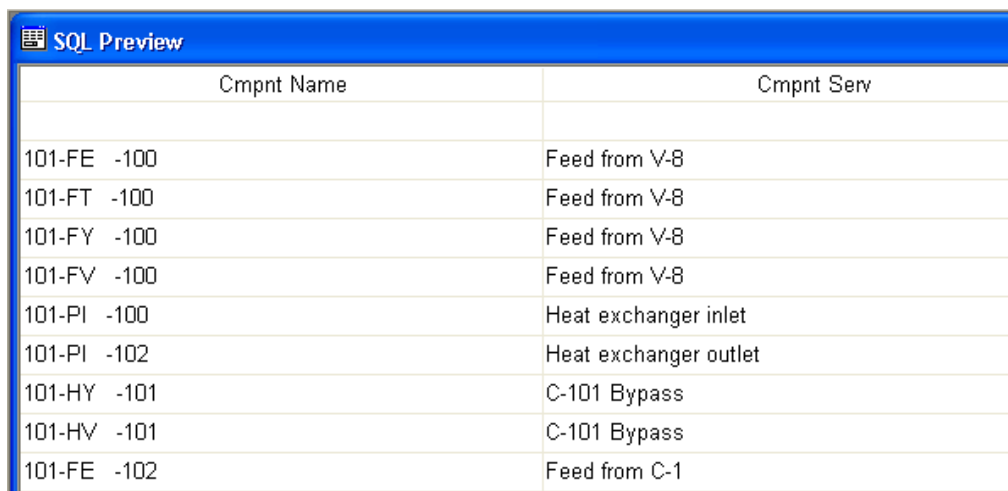
1. With the main **InfoMaker** window open, click .
2. On the **New** dialog box, click the **Database** tab.
3. Double-click **Query**  to open the **Select Tables** dialog box.
4. Select the desired tables.



5. When finished, click **Open** to display the **Query** window.
6. Click **View > Table Layout**.
7. Select the desired columns as shown in the following example.



8. Click  to view the available data as shown.



Cmpnt Name	Cmpnt Serv
101-FE -100	Feed from V-8
101-FT -100	Feed from V-8
101-FY -100	Feed from V-8
101-FV -100	Feed from V-8
101-PI -100	Heat exchanger inlet
101-PI -102	Heat exchanger outlet
101-HY -101	C-101 Bypass
101-HV -101	C-101 Bypass
101-FE -102	Feed from C-1

9. Click the close box to close the **Preview** window and return to the **Query** window.
10. If you want to select additional tables, click  to reopen the **Select Tables** dialog box.
11. Perform additional steps as needed. These can include the following:
 - Using the **Join** function to rebuild links manually between table rows.
 - Defining a sort sequence for the retrieved data.
 - Using a **Where** condition to filter the retrieved data.

NOTE Full details of these procedures are beyond the scope of this topic. For further information, see to the InfoMaker documentation.

12. To view details of your query, click the **Syntax** tab. The following screen shot shows an example of a query.

```
SELECT "demo"."component"."cmpnt_name",
       "demo"."component"."cmpnt_serv"
FROM "demo"."component"
WHERE "demo"."component"."plant_id" <> 0

ORDER BY "demo"."component"."cmpnt_name" ASC
```

13. When finished, save your query by doing one of the following:

- Click .
- Click **File > Save Query**.

14. On the **Save Query** dialog box, in the **Queries** box, type a name for your query.

NOTES

- Your query name must not include any spaces.
- The software saves the query in the backup library that you defined.

See Also

Create an InfoMaker Library (on page 616)

Calibration Form Customization

Customization of calibration form pages requires extensive knowledge of InfoMaker. The **Page Editor** options of the Specifications module are insufficient to customize a calibration page properly. Therefore, a number of template .psr files come shipped with SmartPlant Instrumentation. These .psr files are designed according to pre-defined calibration types. You can customize these files in InfoMaker as needed and then import them into the Specifications module as form pages.

NOTE It is recommended that you back up the shipped files before customizing.

When customizing forms, you can do the following:

- Design the layout of data fields on the form
- Specify conditions under which data fields on the form are editable, visible, or protected
- Determine the scope of data values to be used — depending on the form type, these values may include instrument data, settings, or calibration data entry values
- Add expressions used to calculate results and errors
- Specify conditions for dynamic highlighting and background colors for data fields based on particular values of results (for example, depending on whether actual values exceed a predefined tolerance limit)
- Design the correct print layout — this is required because a calibration form, whether shipped or user-defined, can only comprise a single data page

In SmartPlant Instrumentation, expression validation is done directly in the form page in the Calibration module. The standard forms already have all possible expression types, which you can use as examples to create your own expressions in InfoMaker. You must restore these forms in the Specifications module and then regenerate the form pages to be able to use them for calibration.

The standard calibration settings page includes columns from the COMPONENT and CALIBRATION_SETTING tables. The standard calibration data entry page includes columns from the COMPONENT, CALIBRATION_RESULT, and CALIBRATION_RESULT_POINTS tables. It is not possible to add columns from other tables in calibration pages.

Form Page Customization Procedures

These procedures deal with customizing spec form or calibration form pages in InfoMaker. You can customize any specification form page in InfoMaker after saving this page as a .psr file in the Specifications module. A number of .psr files containing calibration form pages already come shipped with SmartPlant Instrumentation. After customizing a .psr file, you must retrieve the .psr file as a form page back into the Specifications module, where such page is indicated as a custom page.

General Procedures for All Form Page Types

Open a Form Page in InfoMaker

Use this procedure to open a form page in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).

Add a Unit of Measure Drop-Down Data Window in a PSR File

Use this procedure to assign a unit of measure drop-down data window to a custom field of a form page saved as a .psr file. You can use this procedure as a starting point for assigning any drop-down data window to a data field. All the drop-down data windows appear in the shipped library file sp_style.pbl, which resides in your SmartPlant Instrumentation home folder. This procedure applies to specifications and calibration forms:

- After you open a spec page .psr file in SmartPlant Instrumentation, save it as a new page and associate it with a spec form, all specifications based on this form are generated with the drop-down data window that you added.
- After you open a calibration page .psr file in SmartPlant Instrumentation, save it as a new page and associate it with a Calibration Settings or Calibration Data Entry form, the form that you open in the Calibration module contains the drop-down data window that you added.

For details, see *Add a Unit of Measure Drop-Down Data Window in a PSR File* (on page 622).

Add a Select List in a PSR File

Use this procedure to create a select list and assign it to a custom field of a form page saved as a .psr file. This procedure applies to specifications and calibration forms:

- After you open a spec page .psr file in SmartPlant Instrumentation, save it as a new page and associate it with a spec form, all specifications based of this form are generated with the select list that you added.
- After you open a calibration page .psr file in SmartPlant Instrumentation, save it as a new page and associate it with a Calibration Settings or Calibration Data Entry form, the form that you open in the Calibration module contains the select list that you added.

For details, see *Add a Select List in a PSR File* (on page 623).

IMPORTANT If you are changing a page that is used as part of a composite spec, and are planning to import it into SmartPlant Instrumentation, over-writing the existing page, be sure to maintain page dimensions. If you modify page coordinates, verify that the composite spec(s) using this page are not compromised.

Procedures for Calibration Form Pages

Add a Single-Use Column in a Calibration Form Page

Use this procedure to add a single-use column in a form page. A single-use column is represented in the form page by a single data field, for example, **Calibration date (calib_date field)**. For details, see *Add a Single-Use Column in a Calibration Form Page* (on page 624).

Add a Multi-Use Column in a Calibration Form Page

Use this procedure to add a multi-use column in a form page. A multi-use column is represented in the form page by multiple data fields. For example, in a tank strapping calibration, you might need to obtain and record several result points within a certain period of time. These result points are represented in the database by the same table column. In the form page, each result point data field contains the column name and unique suffix. For details, see *Add a Multi-Use Column in a Calibration Form Page* (on page 624).

Add an Expression for Field Protection

Use this procedure to set the background of a field as protected or editable, depending on the field value and calibration type. For details, see *Add an Expression for Field Protection* (on page 625).

Add an Expression for Background Color of Protected or Editable Field

Use this procedure to specify the Windows Background color value in the expression when the field is editable and the Button Face value when the field is protected, depending on the field value and calibration type. For details, see *Add an Expression for Background Color of Protected or Editable Field* (on page 627).

Add an Expression for Background Color of Result Field

Use this procedure to set the software to display a colored background when the result field value exceeds the specified limit, for example, if the As Found field value exceeds the allowed tolerance. A result field is a field that shows a calculated value based on a calibration formula. For details, see *Add an Expression for Background Color of Result Field* (on page 628).

Add an Expression for Field Visibility

Use this procedure to set a certain field as visible or invisible, depending on the field value. For details, see *Add an Expression for Field Visibility* (on page 629).

Enable the Use of Fractions of an Inch

Use this procedure to display fractions of an inch (sixteenths) for tank strapping calibrations. You must perform this procedure because PowerBuilder, which the programming code basis for the Calibration module, does not support the display of fractions in data fields. You can enable the use of fractions of an inch either in a data field that is represented in the database by a specific table column or set the software to display fractions of an inch in a computed field you define in InfoMaker. To display fractions of an inch in a computed field, you must assign an appropriate expression to the computed field. For details, see *Enable the Use of Fractions of an Inch* (on page 630).

Define a Computed Field for Calibration

Use this procedure to define a computed field and specify a compute expression. For details, see *Define a Computed Field for Calibration*.

Open a Form Page in InfoMaker

NOTE When opening a calibration form shipped in .psr format, start the procedure with **Step 5**.

1. Open a form page in the **Page Editor** of the Specifications module. For details, see *Open a Page* (on page 203).
2. Do one of the following:
 - On the **Page Editor** menu bar, click **Actions > Save as File**.
 - On the **Page Editor** toolbar, click .
3. On the **Save As** dialog box, navigate to the required folder and type the file name of the target .psr file.
4. Click **OK** to save the file.
5. In InfoMaker, connect to the target Domain schema of SmartPlant Instrumentation.
6. In InfoMaker, on the menu bar, click **File > New**.
7. On the **New** dialog box, on the **Object** tab, select **Grid**.
8. In the **Grid Report Generator** wizard, select **SQL Select** and click **Next**.
9. On the **Select Tables** dialog box, select any table and click **Open**.
10. Under **Selection list**, click any table column.
11. On the menu bar, click **File > Return to DataWindow Painter**.
12. In the **Grid Report Generator** wizard, click **Next** and then **Finish**.
13. On the menu bar, click **File > Open File**.
14. When prompted to save changes to (Untitled), click **No**.
15. On the **Select a File Name** dialog box, select the .psr file and click **Open**.

Add a Unit of Measure Drop-Down Data Window in a PSR File

1. In InfoMaker, to define the sp_style.pbl library as your working library, do the following:
 - a. Click **Tools > Library Painter**.
 - b. Right-click **sp_style.pbl** and then, on the shortcut menu, click **Set as working library**.
- TIP** The sp_style.pbl file is a shipped library containing all drop-down data windows of SmartPlant Instrumentation. The file resides in your SmartPlant Instrumentation home folder.
2. Open the target form page that you saved as a .psr file. For details, see *Open a Form Page in InfoMaker* (on page 622).
 3. In the **Report** window, right-click the target table column that is used as a custom field in the spec page, and then, click **Properties**.
 4. In the **Properties** window, click the **Edit** tab, and then, do the following:
 - a. From the **Style Type** list, select **DropDownDW**.
 - b. Select **Always Show Arrow** to display in the spec page an arrow box inside the field to indicate that this field is assigned to a drop-down data window or select list.
 - c. Select **V ScrollBar** to display a vertical scroll bar when the drop-down data window contains a long list values.
 - d. Beside the **DataWindow** box, click .

- e. On the **Select Report** dialog box, select a unit of measure drop-down data window you want to assign to the field. For details about the available drop-down data windows that retrieve units of measure, see *Drop-Down Data Windows that Retrieve Units of Measure* (on page 623).
- f. From the **Display Column** list, select **uom_code**.
- g. From the **Data Column** list, select **uom_code**.
5. Save the .psr file.
6. Test your drop-down data window assignment in SmartPlant Instrumentation, open the .psr file in the **Page Editor**, save it as a new regenerated page, assign to a form, and generate a specification based on this form.

Drop-Down Data Windows that Retrieve Units of Measure

All drop-down data windows in SmartPlant Instrumentation reside in the sp_style.pbl file, which is located in the SmartPlant Instrumentation home folder. The following table lists and describes all drop-down data windows containing SQL Select commands that retrieve units of measure from the SmartPlant Instrumentation database.

Drop-Down Data Window	Description
d_dddw_uom	Retrieves all units of measure that exist in SmartPlant Instrumentation
dw_uom_dn	Retrieves density units of measure
dw_uom_fl	Retrieves flow units of measure
dw_uom_ln	Retrieves length units of measure
dw_uom_pr	Retrieves pressure units of measure
dw_uom_tm	Retrieves temperature units of measure
dw_uom_vs	Retrieves viscosity units of measure

Add a Select List in a PSR File

1. In InfoMaker, open the target form page that you saved as a .psr file. For details, see *Open a Form Page in InfoMaker* (on page 622).
2. In the **Report** window, right-click the table column (form page data field) to which you want to assign a drop-down data window, and then, click **Properties**.
3. In the **Properties** window, click the **Edit** tab, and then, do the following:
 - a. From the **Style Type** list, select **DropDownListBox**.
 - b. Select **Allow Editing** if you want to be able to enter a text string instead of selecting a list value when defining specification data in SmartPlant Instrumentation. This does not affect the values on the list box itself.
 - c. Select **Sorted** to displays the values alpha-numerically in descending order (values starting with a numeric character will be displayed at the top of the select list).
 - d. Select **Always Show Arrow** to display in the spec page an arrow box inside the field to indicate that this field is assigned to a select list or drop-down data window.
 - e. Select **V ScrollBar** to display a vertical scroll bar when the select list is long.

- f. Under **Code Table**, in the **Display Value** column, define unique values. These values will appear in the select list in a generated spec.
- g. In the **Data Value** column, define unique values to associate with the display values. These values will appear in the database as the table column values.

NOTE In the **Limit** box, decrease the displayed value if needed. This is required to prevent value truncation in the generated specification. Value truncation can occur if the data field width in the spec is smaller than the table column length in the database.

4. Save the .psr file.
5. Test your select list definition in SmartPlant Instrumentation by opening the .psr file in the **Page Editor**, saving it as a new regenerated page, assigning to a form, and generating a specification based on this form.

Add a Single-Use Column in a Calibration Form Page

1. In InfoMaker, open the target form page saved as a .psr file. For details, see *Open a Form Page in InfoMaker* (on page 622).
2. On the **Report** window, click **Insert > Control > Column**.
3. In the **Detail** section of the **Report** window, click where you want to place the column.
4. On the **Select Column** dialog box, which opens automatically, select the target column from the list.
5. Depending on the calibration form type, do one of the following:
 - If the form type is **Calibration Settings**, click **OK**.
 - If the form type is **Calibration Data Entry**, in the **Row in details** box, enter a temporary numeric suffix and then click **OK**. You cannot close the **Select Column** dialog box until you define a suffix.
- **IMPORTANT** If the form type is **Calibration Data Entry**, after placing the column in the form, you must manually remove the suffix from the column name on the **General** tab of the **Properties** section.

Add a Multi-Use Column in a Calibration Form Page

1. In InfoMaker, open the target calibration data entry form page saved as a .psr file. For details, see *Open a Form Page in InfoMaker* (on page 622).
2. In the **Report** window, click **Insert > Control > Column**.
3. In the **Detail** section of the **Report** window, click where you want to place the column.
4. On the **Select Column** dialog box, which opens automatically, do the following:
 - a. Select the target column from the list.
 - b. In the **Row in details** box, enter a unique numeric suffix without an underscore.
 - c. Click **OK**.

Add an Expression for Field Protection

This procedure allows you to set the background of a field as protected or editable, depending on the field value and calibration type. For a specific example of such a field and expression, see *IF Expression for Field Protection* (on page 625).

IMPORTANT

- Tab order value of 0 (zero) overrides field protection expression. Field tab order is set in the Specifications module of SmartPlant Instrumentation. 0 (zero) tab order indicates that the field is non-editable. For details, see *Set the Tab Order of the Fields on a Page* (on page 209).
 - The 0 (zero) tab order value is assigned automatically to every new table column you add in the form page in InfoMaker. If you add new fields in InfoMaker and include these fields in an expression for field protection, after completing this procedure, and opening the form page in the Specifications module, you must switch to the default tab order. For details, see *Switch to the Default Tab Order* (on page 209).
1. Open the target form page saved as a .psr file in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).
 2. In the **Report** window, right-click the target table column, and click **Properties**.
 3. In the **Properties** window, on the **General** tab, beside the **Protect** box, click .
 4. On the **Protect** dialog box, do the following:
 - a. In the **Functions** pane, click the **if(b, t, f)** function, in which **b** stands for a Boolean expression, **t** for true, and **f** for false.
 - b. Substitute the **b** argument with the name of the table columns that you want to protect, operators, and values.
 - c. Substitute the **t, f** arguments with the protection values, with **0** indicating that the field is editable and **1** that the field is protected.
 - d. Close the **Protect** dialog box.
- TIP** On the **General** tab, the **Protect** box now displays the expression and the expression icon changes to .
5. If needed, define the field background display conditions. For details, see *Add an Expression for Field Background Color* (see "Add an Expression for Background Color of Result Field" on page 628).
 6. Save the .psr file.

IF Expression for Field Protection

Syntax

if(b, t, f)

in which **b** stands for a Boolean expression, **t** for true and **f** for false. You substitute the **t** and **f** arguments with **0** and **1**. When true, the value of **0** indicates that the field is editable and **1** that the field is protected.

Example 1

In this example, the expression sets the measuring point field **calib_set_single_pnt_level** as editable in the **Tag Calibration Settings** window and non-editable (protected) in the **Calibration Profile Settings** window. The expression does not apply to the Function Check or Switch Set Point calibration types.

if(calib_set_no_pnt=1 and cmpnt_id<>0 and calib_type_id<>2 and calib_type_id<>3,0,1)

The following table describes each expression segment individually.

Expression Segment	Description
calib_set_no_pnt=1	The Number of points field value on the Calibration Settings form is defined as 1.
cmpnt_id<>0	Instrument tag number exists (tag number ID is other than 0).
calib_type_id<>2 and calib_type_id<>3	Calibration type is not Function Check or Switch Set Point.
0,1	editable, protected

NOTES

- The cmpnt_id value determines whether the software opens the **Calibration Profile Settings** window or the **Tag Calibration Settings** window in the **Calibration** module. To open profile settings, the software runs an SQL command which includes the following parameter: cmpnt_id=0; whereas, to open calibration settings for an instrument, the software runs an SQL command which includes the cmpnt_id value of that instrument.
- For details of calibration type ID numbers, see *Calibration Type ID Numbers* (on page 627).

Example 2

In this example, the expression sets the measuring point field **calib_set_single_pnt_level** as editable in the **Calibration Data Entry** window and non-editable (protected) in the **Calibration History** window. The expression does not apply to the Function Check or Switch Set Point calibration types.

if(calib_no_pnt=1 and (isnull(calib_hist_flg) or calib_hist_flg='0') and calib_type_id<>2 and calib_type_id<>3,0,1)

The following table describes each expression segment individually.

Expression Segment	Description
calib_no_pnt=1	The Number of points field value on the Calibration Data Entry form is defined as 1.
isnull(calib_hist_flg) or calib_hist_flg='0'	The calib_hist_flg value is NULL or 0.
calib_type_id<>2 and calib_type_id<>3	Calibration type is not Function Check or Switch Set Point
0,1	editable, protected

NOTE The calib_hist_flg value determines whether the software opens the **Calibration Data Entry** or **Calibration History** window. If the value is '0' or NULL, the software opens the **Calibration Data Entry** window; whereas, if the value is '1', the software opens the **Calibration History** window. The calib_hist_flg value is character and not integer; therefore, in the expression, you must enclose the calib_hist_flg value in single quotes.

Calibration Type ID Numbers

When defining expressions in InfoMaker, you can specify conditions for inclusion or exclusion of certain calibration types that exist in SmartPlant Instrumentation. The calibration types are fixed in the database. The CALIB_TYPE_ID column holds the unique ID numbers of the calibration types.

Calibration Type	CALIB_TYPE_ID Column Value
Multiple Point	1
Function Check	2
Switch Set Point	3
Alarm/Trip/Set Point	4
Fiscal Flow Meter Proving	5
Tank Strapping	6

Add an Expression for Background Color of Protected or Editable Field

You use this procedure to specify the Windows Background color value in the expression when the field is editable and the Button Face value when the field is protected, depending on the field value and calibration type. For examples of a field color expression, see *IF Expression for Field Color* (on page 628).

Prerequisite

- An expression for settings the appropriate background color always depends on the field protection expression. Therefore, you must also define an expression for field protection. For details, see *Add an Expression for Field Protection* (on page 625).
1. Open the target form page saved as a .psr file in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).
 2. In the **Report** window, right-click the target table column, and click **Properties**.
 3. In the **Properties** window, click the **Fonts** tab.
 4. Beside the **Background Color** box, click .
 5. On the **Background Color** dialog box, do the following:
 - a. In the **Functions** pane, click the **if(b, t, f)** function, in which **b** stands for a Boolean expression, **t** for true, and **f** for false.
 - b. Substitute the **b** argument with the same Boolean expression you defined in the field protection expression on the **General** tab.
 - c. Substitute the **t, f** arguments with the background color parameters as you require.
 - d. Close the **Background Color** dialog box.
- TIP** On the **Font** tab, the icon beside the **Background Color** box changes to . You can ignore the color setting displayed in the box because an expression overrides the specific property value defined in the **Properties** window.
6. Save the .psr file.

IF Expression for Field Color

Example 1

In this example, the expression sets the Windows Background color for the measuring point field if it is editable and Button Face color if the measuring point field is protected. This expression is used together with the field protection expression. The expression does not apply to the Function Check or Switch Set Point calibration types.

```
if(calib_set_no_pnt=1 and cmpnt_id<>0 and calib_type_id<>2 and  
calib_type_id<>3,1073741824,67108864)
```

Background Color	Value	Description
Windows Background	1073741824	Standard background color indicating that the field is enabled for editing
Button Face	67108864	Standard background color indicating that the field is disabled for editing.

Example 2

In this example, the expression sets the red background for the As Found tolerance field if the field value exceeds the tolerance value.

```
If(as_found > tolerance, rgb(255,0,0),1073741824)
```

The following table describes the background color use in the IF expression.

Background Color	Value	Description
RGB	Value from 1 to 255 in the function rgb(0,0,0)	Colored background indicating that the field value exceeds the allowed limit
Windows Background	1073741824	Standard background color indicating that the field is enabled for editing

Add an Expression for Background Color of Result Field

A result field is a field that shows a calculated value based on a calibration formula. Use this procedure to set the software to display a colored background when the field value exceeds the specified limit, for example, if the As Found field value exceeds the allowed tolerance. For examples of a field color expression, see *IF Expression for Field Color* (on page 628).

1. Open the target form page saved as a .psr file in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).
2. In the **Report** window, right-click the target table column, and then, click **Properties**.
3. In the **Properties** window, click the **Fonts** tab.
4. Beside the **Background Color** box, click .
5. On the **Background Color** dialog box, do the following:

- a. In the **Functions** pane, click the **if(b, t, f)** function, in which **b** stands for a Boolean expression, **t** for true, and **f** for false.
 - b. Substitute the **b** argument with the name of the table column whose background you want to mark with a distinct color, and also define the condition.
 - c. Substitute the **t, f** arguments with the background color parameters as you require.
TIP You can substitute the **t, f** arguments with the InfoMaker RGB function **rgb(0,0,0)** and **f** with **1073741824**, which is the standard Windows Background color set for an editable field. In the RGB function, you can enter any number in the range between 1 and 255, as you require.
 - d. Close the **Background Color** dialog box.
TIP On the **Font** tab, the icon beside the **Background Color** box changes to . You can ignore the color setting displayed in the box because an expression overrides the specific property value defined in the **Properties** window.
6. Save the .psr file.

Add an Expression for Field Visibility

This procedure allows you to set a certain field as visible or invisible, depending on the field value. For a specific example of such a field and expression, see *IF Expression for Setting Fields as Visible* (on page 630).

1. Open the target form page saved as a .psr file in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).
2. In the **Report** window, right-click the target table column, and click **Properties**.
3. In the **Properties** window, on the **General** tab, beside the **Visible** check box, click .
4. On the **Visible** dialog box, do the following:
 - a. In the **Functions** pane, click the **if(b, t, f)** function, in which **b** stands for a Boolean expression, **t** for true, and **f** for false.
 - b. Substitute the **b** argument with the name of the table column, operator, and value.
 - c. Substitute the **t, f** arguments with **1** indicating that the field is visible and **0** that the field is invisible.
 - d. Close the **Visible** dialog box.**TIP** On the **General** tab, the icon beside the **Visible** check box changes to green . The expression overrides the **Visible** check box setting.
5. Save the .psr file.

See Also

Customizing Form Pages in InfoMaker Common Tasks (see "Form Page Customization Procedures" on page 620)

IF Expression for Setting Fields as Visible

Syntax

if(b, t, f)

in which **b** stands for a Boolean expression, **t** for true and **f** for false. You substitute the **t** and **f** arguments with **1** and **0**. When true, the value of **1** indicates that the field is visible and **0** that the field is invisible.

Example

In this example, the expression sets the expected output field in the **Calibration Data Entry** and **Calibration History** windows as visible if the As Found result point value is equal to or greater than 1; otherwise, the field is invisible.

```
if(calib_no_pnt >= 1,1,0)
```

Enable the Use of Fractions of an Inch

This procedure allows you to display values in the feet-inch- sixteenths format in tank strapping calibrations. You must perform this procedure because PowerBuilder, which the programming code basis for the Calibration module, does not support the display of fractions in data fields. You can enable the use of fractions of an inch either in a data field that is represented in the database by a specific table column or set the software to display fractions of an inch in a computed field you define in InfoMaker. To display fractions of an inch in a computed field, you must assign an appropriate expression to the computed field in InfoMaker. For a specific example of a computed field and expression, see *Expression for Displaying Fractions of an Inch* (on page 631).

IMPORTANT

- The feet-inch-sixteenths format is not supported outside the Calibration module, that is, in browser views or when accessing the field from database tools.
- It is only possible to display sixteenths of an inch in a calibration form field.

Prerequisite

- Make sure that the unit of measure for target field is defined as ft.
1. Open the target form page saved as a .psr file in InfoMaker. For details, see *Open a Form Page in InfoMaker* (on page 622).
 2. In the **Report** window, right-click the target numeric table column, and click **Properties**.
 3. In the **Properties** window, on the **Edit** tab, under **Style Type**, select **EditMask**.
 4. In the **Mask** box, type the following mask: **##-##-###/16**
TIP In this mask, the pound # symbol stands for a digit. The left segment is used for foot values, the middle for inch values, and the right for a fraction of an inch values.
 5. Click the **Format** tab and do the following:
 - a. Copy the mask into the **Format** box, so that it displays **##-##-###/16**.
 - b. Select **Use Format**.
 - c. Do one of the following:
 - Define a computed field. For details, see *Define a Computed Field for Calibration*.
 - Select an existing computed field.
 6. On the **General** tab of the **Properties** window, under **Compute Expression**, enter the compute expression for displaying fractions of an inch.

7. In the **Properties** window, click the **Format** tab and copy the mask **##-##-##/16** into the **Format** box.

Expression for Displaying Fractions of an Inch

In the following example, the compute expression defined for the computed field **c_af_value_err_1** allows you to display a calibration result in the feet-inch-sixteenths format. This computed field displays a result of the tape reading value of tank height minus gauge reading value in a tank strapping calibration. In the compute expression, the following table columns participate:

- **as_found_value** — Tape reading value in the feet-inch-sixteenths format with the **##-##-##/16** mask defined on the **Edit** and **Format** tabs of the **Properties** window
- **as_left_value** — Gauge reading value in the feet-inch-sixteenths format with the **##-##-##/16** mask defined on the **Edit** and **Format** tabs of the **Properties** window

If you only used decimal values, the **c_af_value_err_1** field would only include the following expression:

as_found_value[0] – as_left_value[0]

The [0] value indicates that this is the first calibration result in the number or runs. The PowerBuilder data window used in the calibration form page contains an array that allows you to enter several result points in the same table column. In the data window, the first occurrence of the column in the array is indicated with the [0] value, the second with [1], and so forth. Therefore, in a compute expression, all the fields should be specified the appropriate result point number in the array. Since the expression includes actual table columns, you do not need to specify any suffixes of multi-use columns. In the form page, each occurrence of a multi-use column is indicated with a unique numeric suffix. For example, when inserting the **as_left_value** column into the form page three times, you must specify the **_1** suffix for the first occurrence of the **as_left_value** column, **_2** for the second occurrence, and **_3** for the third occurrence. In the data window, the first occurrence of the column in the array is indicated with the [0] value, the second run with [1], and so forth.

To use the feet-inch-sixteenths format in the **c_af_value_err_1** computed field, the compute expression must be as follows:

```
getmaskedfeetvalue (getdecimalfeetlength (Left (String ( (as_found_value [
0] ) ,
abs (5-Len (String (as_found_value [0] ) ) ) +1 ) ,
Mid (String (as_found_value [0] ) ,
abs (5-Len (String (as_found_value [0] ) ) ) +2 , 2 ) ,
Right (String (as_found_value [0] ) , 2 ) )
- getdecimalfeetlength (Left (String (as_left_value [0] ) ,
abs (5-Len (String (as_left_value [0] ) ) ) +1 ) ,
Mid (String (as_left_value [0] ) ,
abs (5-Len (String (as_left_value [0] ) ) ) +2 , 2 ) ,
Right (String (as_left_value [0] ) , 2 ) ) )
```

In the compute expression, the following rules and conditions apply:

- The table columns must be defined a feet-inch-sixteenths mask **##-##-##/16** on the **Edit** and **Format** tabs of the **Properties** window.
- The computed field that includes these table columns must also have the same feet-inch-sixteenths mask on the **Format** tab of the **Properties** window.

- The compute expression must include the **getmaskedfeetvalue** and **getdecimalfeetlength** functions. Without these function, the computed field on the calibration form does not display the correct value. The **getdecimalfeetlength** function reads the values from each segment in the mask and retrieves the decimal value of the feet length. After that, the **getmaskedfeetvalue** reads the decimal value and displays the value in the feet-inch-sixteenths format in the calibration form.

NOTES

- Although the compute expression seems complex, when defining another expression, you can copy the current expression to the target computed field, and then, you only need modify the result point occurrence in the array and the field names.
- **getdecimalfeetlength** and **getmaskedfeetvalue** are SmartPlant Instrumentation internal functions (not available in InfoMaker).
- The feet-inch-sixteenths format is not supported outside the Calibration module, that is, in browser views or when accessing the field from database tools.
- It is only possible to display sixteenths of an inch in a calibration form field.

PSR File Viewer

SmartPlant Instrumentation provides you with a PowerSoft Report (.psr) file viewer that enables you to retrieve, view, and manage files saved in the .psr format. You can create a .psr file when you want to save a report or a specification using the **Save As** command. You can also view and edit .psr files in InfoMaker.

The .psr format allows you to save a multi-page report and nested reports (reports which contain sub-reports or embedded objects). The .psr file format also enables you to design your own reports in InfoMaker and use names of columns from your database. You can then view the reports with the actual data in **PBL Viewer**.

Open a PSR File From the PSR List

Use this procedure to select an existing .psr file from the list and view its content. The .psr file list is useful where you have a permanent set of standard .psr files that you want to view frequently.

1. Within any module, click **File > Import PSR**.
2. Do one of the following:
 - Click .
 - Click **Actions > List**.
3. In the **PSR List** window, select the .psr file you want to view in the **PSR File Viewer** window.
4. Click .

Retrieve a Previously Saved PSR File

1. Within any module, click **File > Import PSR**.
2. Do one of the following:
 - Click .
 - Click **Actions > PSR Viewer**.
3. In the **Select Report File** dialog box, navigate to the desired .psr file and click **OK** to display the content of the selected .psr file in the **PSR File Viewer** window.

Retrieve a Report from a PBL File

IMPORTANT Prior to retrieving the reports from the appropriate .pbl file you need to define the .pbl file location. To define the .pbl file location, in the [Custom] section of the Intools.ini file, for the **LibraryList** parameter, type the .pbl file path and one of the .pbl file names in the path.

1. With the **PSR File Viewer** window open, click .
 2. In the standard **Select Source File** dialog box, navigate to the required .pbl file and click **OK**.
- CAUTION** Make sure you select an appropriate .pbl file, as the .pbl format is also used for purposes other than storing reports.
3. In the **DataWindow List** pop-up window, scroll to the required data window and select it.
 4. Click  to retrieve the appropriate column data from the database and display it in the **PSR File Viewer** window.

Manage the PSR File List

1. In the **PSR File Viewer** window, click .
2. In the **PSR List** window, in the **Description** data field, type in a description to characterize the selected .psr file.
3. Perform one of the following actions as required:

Click...	...to do the following:
Insert	Append a new line where you can type in the path statement for an existing .psr file.
File	Retrieve a .psr file from a folder and add it to the list.
Delete	Remove a .psr file from the list.
Path	Set a new default path for all the files in the list. This option is useful if you have moved all the .psr files in the list to the same folder and you need to show the new location so that the files can be found. In this case, you do not need to change each file path separately. At least one .psr file must already be present in the required path.
Select	Display the data for the highlighted file in the PSR File Viewer window.

CAUTION If you click **Path** and choose a new folder location for the .psr files, the original paths that were displayed for the files will be overwritten. You should therefore only use this option where you are certain that all the files in the list are located in the same folder.

4. On completion of the required action, click **Save**.

Add Custom Fields in a PSR File

When working with reports, you sometimes need to use extra fields in addition to those currently available to you. A number of custom fields (named Udf C01, Udf C02, and so forth.) are appended by default to every .psr file that you import. After saving a report as a .psr file, you can retrieve your custom field values and include them in the header of the desired report.

1. Start InfoMaker.
2. Build a query for generating a report. For details, see *Build a Query* (on page 617).
3. For each custom field that you want to add, do the following:
 - a. With the main report window open, click **Insert > Control > Computed Field**.
 - b. Click the mouse pointer at the position where you want to place the computed field on the report.
 - c. On the **Modify Expression** dialog box, under the **Expression** section, type an expression according to the following syntax:

```
ProfileString("<SmartPlant Instrumentation home  
folder>\intools.ini", "External  
Report", "<s_udf_name>", "<s_udf_value>")
```

For example:

```
ProfileString("C:\Program  
Files\SmartPlant\Instrumentation\intools.ini", "External  
Report", "udf_C01", "Not found")
```

TIP The 's_udf_value' parameter is used to specify a default string to display where no value exists for the specified custom field.
 - d. At the right of the report, using the **Position**, **Font**, and **Format** tabs, make the desired definitions for the custom field, for example, alignment, color, style, and so forth.
4. If you intend to display more than one .psr file in the SmartPlant Instrumentation **PSR List** window, display the SQL data source, and under the where section, type the following expression:

```
psr_storage.psr_stor_desc='<PSR description>'
```

IMPORTANT Without adding this expression to InfoMaker, SmartPlant Instrumentation always retrieves from the database the first row of custom fields in the **PSR List** window, regardless of the report you select. Make sure that the '< PSR description>' has the same value as the value in the **Description** column of the **PSR List** window.
5. Save the current report as a .psr file.
6. Open SmartPlant Instrumentation.
7. With any main module window open, click **File > Import PSR**.
8. In the **PSR File Viewer** window, click  to open the **PSR List** window.
9. Scroll to the right side of the window to view the custom field columns and in the columns Udf C01 to Udf C10, type the desired values.
10. Click **Save**  to save the changes to the database.

Retrieve Custom Field Values from PSR Files

Use this procedure to retrieve your custom (UDF) field values from existing .psr files and include these values in the header of a report in SmartPlant Instrumentation.

IMPORTANT If more than one .psr file is displayed in the **PSR List** window, you must open the desired report in InfoMaker, and under the **Where** section, type the following expression:

```
psr_storage.psr_stor_desc='<PSR description>'
```

Without adding this expression to InfoMaker, SmartPlant Instrumentation always retrieves from the database the first row of custom fields in the **PSR List** window, regardless of the report you select. Make sure that the '< PSR description>' has the same value as the value in the **Description** column of the **PSR List** window. When done, save the changes to the report and close InfoMaker.

1. From SmartPlant Instrumentation, do one of the following:
 - Retrieve the desired .psr file — for details, see *Retrieve a Previously Saved PSR File* (on page 632). Then, on the **PSR File View** window toolbar, click .
 - Open the desired .psr file from the **PSR List** window. For details, see *Open a PSR File From the PSR List* (on page 632).
2. In the data window of the **PSR List** window, select a .psr file with custom fields.
3. Do one of the following to open the **PSR File Viewer** window:
 - Double-click the selected .psr file.
 - Click .
 - Click **Actions > Select**.
4. On the **PSR File Viewer** window toolbar, click .

TIP For the selected file, the software copies the values in columns Udf C01 to Udf C10 to the [External Report] section of the Intools.ini file so that the appropriate custom field values appear in the report.

Customizing Title Blocks for Reports

Title blocks for reports are templates that SmartPlant Instrumentation uses for the design of its reports. While the standard default title blocks supplied with the software are adequate for many reports, you can also create your own custom title blocks that provide you with the required design and layout of your reports. You can, for example, customize report titles and headers, as well as the frame size of the title block.

You first create a title block or duplicate it from an existing one using InfoMaker and save it as a .psr file. You then open the .psr file in SmartPlant Instrumentation and add it to the title block inventory. After that, you need to associate the title block with the required reports and finally, generate a report through the relevant module using the created title block.

TIP It is usually more convenient to edit an existing title block and save it under a different name rather than to create a new one.

Requirements for Customized Report Title Blocks

You can customize a title block for reports in InfoMaker. In either application, the custom title block has to meet several standard requirements. The title block has to be compatible with the report it is associated with. Therefore, make sure that the customization process accurately fits the SmartPlant Instrumentation customizing conventions as specified in the following topic.

The following list outlines mandatory and optional InfoMaker requirements:

Report type — When creating a new report set the report type to be **External** (mandatory).

Report style — Set the report style to be **Tabular** (mandatory).

Field prompt — When prompted to set the required fields for a title block, type any text in the appropriate field. There is no significance to inserting any particular field name as long as something is typed (mandatory).

Group — The title block customization has to be performed in the **Detail** group (mandatory).

Layer — Make sure that you create the title block in the **Band** layer (the default – mandatory).

Design — The frame of the title block consists of four lines. Make sure that each line has its own unique name typed in small caps as follows:

Upper side	L_width
Lower side	In_down
Left side	In_left
Right side	In_right

IMPORTANT When adding other design- related items, such as internal lines, text boxes, and so forth, to the title block, make sure that the names of the new items contain the **tb** segment. For example, if you want to add a new line, name the line as **< Line> _tb < 1>**. This is required to distinguish between items that belong to the title block and items that belong to the rest of the report outside the title block.

Field type — select any field type other than **Column** (mandatory).

Revisions — Make sure that you have a number 1 revision field. For instance, a title block with solely a revision no. 2, would not apply.

Report measurement units — The units of measure of the customized title block must be compatible with the units of measure of the report it is associated with. All the reports were created in inches except for the following, which use PowerBuilder units:

- All the calculation reports
- The Segment map report

Fields — SmartPlant Instrumentation created an inventory of macros available for the custom title block fields. From this inventory you can select the fields that serve your purposes most. Each field and macro has its unique name (this is the name to insert in the name field when creating the item in InfoMaker) as shown in the tables below.

NOTES

- Macros retrieve the data and enter it to the fields. For these macros to function properly, you must insert the macro name accurately according to the macro tables below.
- You can implement custom title blocks that for macros custom_1 through custom_5 display field values without labels, for example, DCS-1 instead of Panel DCS-1. To enable this option, make sure that the [Custom] section of the intools.ini file includes the line 'RemoveFixedTextFromTB=1'.

Table includes **Text** type fields only:

Field Name	Field Description
custom_1	Report name
custom_2 - custom_5	Item names or other data used in reports or drawings. For example, in a panel-strip report, custom_2 is used to display the panel name, custom_3 is used to display the strip name, and custom_5 is used to display the domain name. All values that the software can retrieve for these macros are hard coded. This means that even if you use all of the custom fields, in the title block, fields that do not have any associated hard coded data appear empty.
eproj_name	Project name (owner operator domain)
project_t	Project header (owner operator domain)
proj_name	Domain name
proj_num	Project number (owner operator domain)
city_name	City name
owner_name	<Plant> owner.
location_name	Location name
plant_hierarchy	Plant hierarchy defined by the Domain Administrator. The default plant hierarchy is Plant\Area\Unit. The Domain Administrator has rights to change the number of plant hierarchy levels and customize the level names.
hierarchy_item_name_x	The name of a specific item in the plant hierarchy, where the segment X defines the plant hierarchy level number. For example, suppose that your plant hierarchy is Plant\Area\Unit, and on the Unit level, you have an item name Crude. To display Crude in the title block, you need to substitute the segment X with the number 3.
plant_name	The name of the item on the highest plant hierarchy level (the default highest level is Plant).
plant_addr1	Address 1 of the highest plant hierarchy level item
plant_addr2	Address 2 of the highest plant hierarchy level item
plant_country	Country of the highest plant hierarchy level item
plant_state	State of the highest plant hierarchy level item
plant_zip	ZIP code of the highest plant hierarchy level item
area_name	The name of the item on the intermediate level of the plant hierarchy (the default intermediate level is Area). If the plant hierarchy has more than three levels, the macro area_name retrieves the name of the lowest intermediate level, that is one level above the lowest level of the plant hierarchy.
unit_name	The name of the item on the lowest level of the plant hierarchy (the default lowest level is Unit).

Field Name	Field Description
hierarchy_udf_y_x	A custom field value associated with a specific plant hierarchy item. The segment y retrieves the number of the custom field (the Domain Administrator can define up to twenty custom field values for each plant hierarchy item). The segment x retrieves the number of the level to which the plant hierarchy item belongs.
hierarchy_udf_y_x_t	Custom fields associated with a plant hierarchy item are regular text fields and behave as any other custom fields that are available in SmartPlant Instrumentation for specific items.
hierarchy_udf_y_x_t	The header of a custom field associated with a specific plant hierarchy item. The segments y and x correspond to the segments in the macro hierarchy_udf_y_x . The segment t indicates the header.
tb_dwg_name_t	Document number
lastrev	Last revision
rev_no_1 - rev_no_9	Revision number 1 (mandatory field)
rev_udf_cXX_1 - rev_udf_cXX_9	Revision custom fields (for more details, see below)
create_by_1 - create_by_9	Created by
date_1 - date_9	The date on which the revision was created
chk_by_1 - chk_by_9	The name or initials of the person who checked the revision
appr_by_1 - appr_by_9	The name or initials of the person authorized to approve the revision
sign_by_1 - sign_by_9	The name or initials of the person authorized to sign the revision. This macro appears in one of the following title block files that come shipped with SmartPlant Instrumentation: default tb with in units.psr or default tb with pb units.psr.
desc_1 - desc_9	Revision description

The following table includes **Computed** type fields only:

Field name	Field description	Expression
C_page_num	Current sheet	Page()
C_page_count	Total sheets	PageCount()
comp_1	Logo name	bitmap (ProfileString ("intools.ini", "Project", "LogoPath", " " + "projlogo.bmp"))

Revision custom fields — You can define your own fields and related macros in addition to those in the inventory of macros (designated for fields) that are supplied with SmartPlant Instrumentation. You can add up to 20 revision custom fields per title block. Inserting the right name in the field name box is necessary for the proper function of the field in the title block. The naming convention for the revision custom fields is as specified in the following table:

rev_udf_c01_t	Header
rev_udf_c01_1	Data field
rev_udf_c01_2	Second data field under the same header
rev_udf_c02_t	Header 2 (another UDF)
rev_udf_c02_1	The data in the field (2)

Document custom fields — Using these fields you can have a record of the documents that were related to a certain report. These are fields that you define under the following limitation: each custom field must have only two fields, one for the header and one for the data. This is the naming convention for these fields:

dwg_udf_c01_t	Header
dwg_udf_c01	Data field
dwg_udf_c02_t	Header 2 (another custom field)
dwg_udf_c02	Data field (2)

Edit Report Title Block Properties

You can edit report title block properties under two editing levels. The first is internal and includes changing the revision custom field headers, document headers and the title block name. The second level is external to SmartPlant Instrumentation and includes changes in the design, replacing macros, fields, adding and removing fields.

1. In the main SmartPlant Instrumentation window, click **Tools > Title Blocks**.
2. In the **Title Block** dialog box, select the desired title block and click **Properties**.
3. In the **Title Block Properties** dialog box, do the following:
 - a. Under **Revision custom field headers**, in the **Header** column, type the name for each custom field.
 - b. In the **Title block name** field, type the name that you have selected for the title block.
 - c. Under **Document custom field headers**, in the **Header** column, type the name for each custom field.

NOTES

- If you want to modify the number of revisions of custom title blocks, you need to add more revision rows and create appropriate macros in InfoMaker. The **Revision rows** box displays the number of revision rows that you have customized for your title block.
- For the second level of editing you can use an external editing application (for example, InfoMaker). When editing title blocks, you must follow the title block requirements.

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